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Violence, Here and Above

Steven Pinker is one of our nation's most illustrious public intellectuals. In an insightful interview in this issue he eloquently explores the almost counterintuitive notion that despite all the violent news that bombards us daily, rates of violence worldwide are actually at historic lows.

I've been fascinated by this argument and its implications ever since Pinker's book *The Better Angels of Our Nature: Why Violence Has Declined* came out, but this is our first opportunity to deal with it in our pages and in his words. I think you'll find it provocative reading. Pinker is a longtime Fellow of our Committee for Skeptical Inquiry. We published an adaptation from his book *The Blank Slate: The Modern Denial of Human Nature* in our March/April 2003 issue.

Pinker, neuroscientist and CSI Fellow Indre Viskontas, and science journalist and SI contributing editor Chris Mooney conducted the interview before a live audience at the 2013 annual meeting of the American Association for the Advancement of Science. It was originally for our Center for Inquiry's *Point of Inquiry* podcast and is downloadable there. For this published version in SI, Pinker, a careful, conscientious writer, made many small improvements for added clarity.

* * *

The half-megaton explosion caused by a sixty-foot-wide mass from the asteroid belt violently slamming into the atmosphere over Chelyabinsk, Russia, in February was an extraordinary, once-in-a-century event. Nothing else like it has been experienced since the Tunguska event of 1908, over Siberia. But this one was widely witnessed and videotaped. In this issue three prominent scientists whose specialties include such cosmic impacts describe what happened and consider the lessons and probabilities of its coincidental, but not connected, relationship in time with the nearby passage of asteroid 2012 DA14. David Morrison, Alan Harris, and Mark Boslough (all frequent SI contributors) drafted this article shortly after the historic event. By the time it got to us, Boslough was already in Chelyabinsk, where he served as the main scientist-on-the-ground for a superb special one-hour *NOVA* documentary about the meteor strike that aired March 27.

* * *

I want to call your attention to a welcome statement issued by twenty-two secular and humanist organizations, including the Center for Inquiry. Titled "An Open Letter to the Secular Community," it is a united call for more civility in online discussions and a pledge to improve their tone and substance. Online blogs and social media postings too often go beyond the bounds of civility. This has been a recent issue in the secular and atheist communities, but we've seen the same problem in public discourse generally. The skeptical community is not immune (see my editorial "Can We Have Civilized Discussions about Touchy Science Policy Issues?" SI, January/February 2013), but the Skeptical Inquirer has long been guided by our determination that authors maintain a professional tone (see our "Guide for Authors") and by Ray Hyman's classic set of guidelines, "Proper Criticism." Both are on our csicop.org website. The open letter is online at the centerforinquiry.net website.

—Kendrick Frazier

CSI Committee for Skeptical Inquiry
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Skeptical Inquirer™
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Do You Believe That? Poll Zeroes in on Conspiracy Beliefs

Kendrick Frazier

Conspiracy thinking seems almost endemic today. People who see conspiracies everywhere seem to have out-of-whack information filters, allowing ideas of conspiracy to easily enter their minds but keeping critical analysis of those same ideas out. We've even recently seen that a paper by psychologists about conspiracy thinking can cause respondents to engage in still more of it (SI, May/June 2013, pp. 7–9).

A new nationwide poll finds some interesting insights into the acceptance of different conspiracy theories. Some ideas are much more widely believed than others.

A new nationwide poll finds some interesting insights into the acceptance of different conspiracy theories. Some ideas are much more widely believed than others. In some cases—as with the Iraq war or global warming—the differences fall along partisan political lines, but some of the more bizarre ideas provoke bipartisan skepticism.

The poll by Public Policy Polling (www.publicpolicypolling.com) of 1,247 registered American voters at the end of March 2013 found that 28 percent of voters believe that a secretive power elite with a globalist agenda is conspiring to eventually rule the world through an authoritarian world government, or New World Order. That idea was believed by 34 percent of Republicans and 35 percent of independents, compared with just 15 per-

Q1 Do you believe global warming is a hoax, or not?
Do 37%
Do not 51%
Not sure 12%

Q2 Do you believe Osama bin Laden is still alive, or not?
Do 6%
Do not 83%
Not sure 11%

Q3 Do you believe a UFO crashed at Roswell, New Mexico, in 1947, and the US government covered it up, or not?
Do 21%
Do not 47%
Not sure 32%

Q4 Do you believe that a secretive power elite with a globalist agenda is conspiring to eventually rule the world through an authoritarian world government, or New World Order, or not?
Do 28%
Do not 46%
Not sure 25%

Q5 Do you believe Saddam Hussein was involved in the September 11th, 2001, attacks on America, or not?
Do 28%
Do not 51%
Not sure 22%

Q6 Do you believe there is a link between childhood vaccines and autism, or not?
Do 20%
Do not 46%
Not sure 34%

Q7 Do you believe the moon landing was faked, or not?
Do 7%
Do not 84%
Not sure 9%

Q8 Do you believe President Barack Obama is the anti-Christ, or not?
Do 13%
Do not 73%
Not sure 13%

Q9 Do you believe the Bush administration intentionally misled the public about the possibility of weapons of mass destruction in Iraq to promote the Iraq War, or not?
Do 44%
Do not 45%
Not sure 12%

Q10 Do you believe aliens exist, or not?
Do 29%
Do not 47%
Not sure 24%

Q11 Do you believe the CIA was instrumental in distributing crack cocaine into America's inner cities in the 1980s, or not?
Do 14%
Do not 55%
Not sure 30%

Q12 Do you believe the government adds fluoride to our water supply, not for dental health reasons, but for other, more sinister reasons, or not?
Do 9%
Do not 74%
Not sure 17%

Q13 Do you believe that shape-shifting reptilian people control our world by taking on human form and gaining political power to manipulate our societies, or not?
Do 4%
Do not 88%
Not sure 7%

Q14 Do you believe that Lee Harvey Oswald acted alone in killing President Kennedy, or was there some larger conspiracy at work?
Lee Harvey Oswald acted alone 25%
There was some larger conspiracy at work 51%
Not sure 24%

Q15 Do you believe in Bigfoot or Sasquatch, or not?
Do 14%
Do not 72%
Not sure 14%

Q16 Do you believe media or the government adds secret mind-controlling technology to television broadcast signals, or not?
Do 15%
Do not 70%
Not sure 15%

cent of Democrats.

Not surprisingly, the poll found there is an intense partisan divide on whether or not global warming is a hoax. Fifty-eight percent of Republicans agreed that it is a conspiracy; 77 percent of Democrats disagree.

Fifty-one percent of Americans believe a larger conspiracy was at work in the John F. Kennedy assassination fifty years ago this November; just 25 percent think Lee Harvey Oswald acted alone.

Do you find the results as bad or worse than expected? Or do you perhaps find some comfort that at least some bizarre beliefs are disbelieved by large margins?

Twenty-nine percent believe aliens exist, and 21 percent believe a UFO crashed at Roswell in 1947. But just 5 percent believe that Paul McCartney died and was secretly replaced by the Beatles in 1966, and just 7 percent of voters think the moon landing was faked.

"Even crazy conspiracy theories are subject to partisan polarization, especially when there are political overtones involved," said Dean Debnam, president of Public Policy Polling. "But most Americans reject the wackier ideas out there about fake moon landings and shape-shifting lizards."

The accompanying box shows some of the specific results of the poll.

A look at the more detailed data cross-tabulated by political affiliation shows interesting variations. For many conspiracy ideas political affiliation doesn't affect the results. This is true, for example, with the Roswell crashed saucer claim, the fake moon landing belief, belief in Bigfoot, and the belief that vaccines cause autism. But belief in a New World Order is held by 45 percent of those who describe themselves as "very conservative" but only 12 percent of those who describe themselves as "very liberal." On the other side, the idea that the government allowed the September 11, 2001, attacks to happen is believed by only 8 percent of Republicans but is believed by 14 percent of Democrats.

Gender differences show up on a few questions. Thirty-nine percent of men—but a slightly smaller proportion of women (35 percent)—believe global warming is a hoax. Twenty-four percent of men and 19 percent of women believe a UFO crashed at Roswell. Thirty-five percent of men but just 21 percent of women believe in the New World Order. Men and women are equal in the belief that vaccines cause autism (20 percent of both genders believe that is true, but women are a little less certain about the truth; 30 percent of men but 38 percent of women are "not sure").

Do you find the results as bad or worse than expected? Or do you perhaps find some comfort that at least some bizarre beliefs are disbelieved by large margins? In either case, conspiracy thinking seems likely to continue to taint our public discourse and to stay a big part of the misinformation and pseudoscience that skeptics deal with for a long time to come.

Kendrick Frazier is editor of the Skeptical Inquirer.

Goat Sacrificed for Chicago Cubs Curse

Benjamin Radford

In early April, an unknown man delivered a smelly box addressed to Tom Ricketts, the owner of the Chicago Cubs baseball team. Inside was a decaying goat's head. Who would send a severed goat's head to Wrigley Stadium? A confused Satanist? An angry mobster trying to send a threat but unable to find a horse?

No, it was a response to a supposed "Billy Goat" curse that dates back to 1945 when a man named Bill "Billy Goat" Sianis had a pet goat (named Murphy) that was refused entry to a Cubs game. Offended by the affront, according to legend he cursed the club with the words, "The Cubs ain't gonna win no more!"

Sure enough, the Cubs lost the next game and have not won a World Series in over a century despite many fan attempts over the years to lift the curse (some of them involving goats). While some regard the curse as merely a silly superstition, many longtime fans take it very seriously. Belief in the Billy Goat curse set the stage for what happened in 2003 when a Cubs fan named Steve Bartman reached for—and deflected—a foul ball in Game 6

of the National League Championship Series that might have been caught by an outfielder. Bartman, who was widely blamed for the Cubs loss by both fans and the news media, received harassment and death threats.

In an ESPN documentary film about that incident titled *Catching Hell*, Yale Professor Benjamin Polak, who analyzed the Cubs's chances of winning at each stage of the game, points out that Bartman's catch only decreased the team's chance of winning by 3 percent; far worse errors were made by the Cubs players themselves throughout that game. Yet many players and fans had been looking for a bad omen, some superstitious sign that their dreams of a long-awaited victory would be spoiled—and Bartman was it. As Polak notes, any team of professional athletes should be able to easily overcome a 3 percent deficit introduced by a random event like fan interference.

Superstitions are common in sports and competitions; for example, some professional tennis players eat exactly the same meals and stay in the same rooms at the same hotels following a big win. They think that their success must have something to do with circumstances beyond their abilities. Some poker players will wear the same "lucky" shirts they were wearing when they hit it big, and so on. However, the Billy Goat curse might be real in one way: Curses sometimes work *because* people believe in them—the same reason that placebos sometimes work. Confidence and focus are important to athletic success, and if a player loses confidence for any reason—including a real or imagined curse—it can affect their performance in very real ways. Either way, the sooner the Cubs win a championship, the sooner goats can rest easier.

Thomas Barrat / Shutterstock.com

Benjamin Radford is the deputy editor of the Skeptical Inquirer.

Sylvia Browne Blunders Again, Telling Mother of Kidnap Victim Amanda Barry She Was Dead

Benjamin Radford

Randy Miramontez / Shutterstock.com

Amanda Berry, who was sixteen-years-old when she went missing in 2003, was rescued on May 6 from an unassuming house in Cleveland where she and others are believed to have been held captive for up to a decade. Berry broke through a door and called for help and two other missing women, Gina DeJesus and Michele Knight, were also rescued from the home. The home's owner, Ariel Castro, and his two brothers were arrested in connection with the case.

Tragically, a high-profile psychic told Berry's mother that she was dead. For nearly two years after her disappearance Amanda Berry's mother, Louwana Miller, held out hope that her daughter would be found alive and returned to her: Maybe Amanda ran away from home and would come back some day or was in an accident and somehow lost her memory. Miller endured the terrible limbo of not knowing, holding out hope against the odds but not wanting to believe the worst.

As *Plain Dealer* writer Stephan Hudak noted, "Desperate for any clue as to Amanda Berry's whereabouts, and tired of unanswered questions from authorities, Miller turned to a psychic on Montel Williams' nationally syndicated

television show. The psychic said what the FBI, police and Miller hadn't. 'She's not alive, honey,' Sylvia Browne told her matter-of-factly. 'Your daughter's not the kind who wouldn't call.' With those blunt words, Browne persuaded Miller to accept a grim probability that has become more likely with each passing day." Miller returned home devastated, and she died two years later, believing that her daughter was dead.

Sylvia Browne was horribly wrong, telling a grieving mother that her child was dead when she was not. And it's not the first time. In an eerily similar situation in 2002, Browne told the parents of missing child Shawn Hornbeck that their son was dead, also on Montel Williams's show. His body, she said, would be found in a wooded area near two large boulders, and he had been kidnapped by a very tall, "dark-skinned man" with dreadlocks.

In fact, Hornbeck and another boy were found very much alive five years later on January 16, 2007, in the home of a Caucasian, non-dreadlocked Missouri man named Michael Devlin who had kidnapped them. Every detail of Browne's psychic vision was wrong, including the most important: that Shawn was dead.

This horrific case also has many similarities to Jaycee Dugard, the girl abducted at the age of eleven in 1991 and discovered living in a virtual prison in the backyard of a couple's home in Antioch, California, eighteen years later. She had been confined, horrifically abused, and raped, even giving birth to her captor's children, who were also kept prisoner and isolated. Hundreds of psychics gave information about Dugard's location while she was missing—and every one turned out to be completely wrong. Psychics make many claims of success, but they are conspicuously unable to find missing persons and rescue innocent women from years of torture and imprisonment.

British Businessman Sentenced in Bogus 'Bomb Detector' Scam

Bogus bomb detectors have been a recurring international problem, a collision of defense needs with pseudoscience. A number of such devices have been exposed (SI, January/February 1997 and January/February 2003). In 2010 the director of a British company that supplied bogus bomb detectors to Iraq was arrested on fraud charges (Jay M. Pasachoff, "Pseudoscience and the Iraq War: Bogus 'Bomb Detectors' Cost Money and Lives," SI, May/June 2010).

Now the head of that company has been convicted of fraud and sentenced to ten years in jail. On May 2, 2013, Judge Richard Hone of Britain's central criminal court sentenced British businessman James McCormick, age fifty-seven, to the ten-year term. Sentencing followed his conviction on April 23 of fraud in the sale of more than 6,000 fake bomb detectors based on $20 golf ball finders bought from the United States. Court documents said he had made more than $75 million from sales of the fake devices in Iraq and Georgia, among other places, claiming they could detect bombs, drugs, currency, and ivory and track objects up to 3,280 feet below ground.

The devices, marketed under the brand ADE, sold for up to $40,000 each, had no working electronics, and were completely useless. They were widely used at checkpoints in Iraq, giving a false sense of security. The Iraqi general who promoted the devices, Jihad al-Jabiri, then head of the Iraqi Ministry of Interior's General Directorate for Combatting Explosives, has been jailed in the scam, along with other police officials.

As McCormick sat impassively at his sentencing Judge Hone chastised him: "Your fraudulent conduct in selling so many useless devices for simply enormous profit promoted a false sense of security and in all probability materially contributed to causing death and injury to innocent individuals.

"The device was useless, the profit outrageous, and your culpability as a fraudster has to be placed in the highest category." ■

Nick Edwards

Businessman James McCormick arrives at the Old Bailey in Central London on the day of his conviction.

A soldier at a checkpoint using an ADE 651

[SKEPTICAL INQUIREE BENJAMIN RADFORD

Benjamin Radford is a research fellow at the Committee for Skeptical Inquiry and author or coauthor of six books, including *Tracking the Chupacabra: The Vampire Beast in Fact, Fiction, and Folklore.*

Psychic Failure and the Boston Marathon Bombing

Q: **You wrote a short Facebook post after the Boston marathon bombing noting that psychics failed to predict the attack. Fair enough, but one question: Say a psychic *did* foresee the event. Would telling anyone have changed anything?**

—C. Morrison

A: I indeed pointed out in a two-sentence post that psychic powers had once again failed to warn the world about life-and-death tragedies and acts of terrorism whose consequences could have been prevented or mitigated. Since no psychics came forward in the days, weeks, or months before the April 15, 2013, Boston attacks to warn authorities, we will never know how the situation might have been different.

It's a valid question, and one echoed by several others, including British skeptic Hayley Stevens, who wrote: "Psychics are damned if they do and damned if they don't. If they'd predicted bombs would explode in Boston during the Marathon we'd berate them for scaremongering. If they don't predict it we berate them for not warning people."

My answer is that if one or more psychics did foresee the event, *and* it could be demonstrated that they had a proven track record of accuracy in previous cases (that is, it's not a random, one-time guess that anyone could do), then I would be the first person to try to help the psychics alert the police, try to identify suspects, and put them under surveillance to thwart the attack. If it's a one-time, vague prediction, I don't think anyone should take it seriously because random events and coincidences happen all the time (simply by random chance, thousands of people every day have seemingly prophetic dreams about events that happen the following day or week). But if there's some reason to think someone has a real predictive ability (whether explained or unexplained), then it absolutely should be taken seriously.

Psychics and Police

This is not merely an academic exercise or abstract thought experiment; we have enough information from real-world cases to have a pretty good idea of what would have happened to a psychic's legitimate information about the Boston bombing.

The claim that police ignore psychics not only plays into the hands of these psychics ("the problem is not that we give bad or vague information, but instead that we're ignored by the police"), but it is also factually wrong. Those who aren't familiar with the history of psychic detectives may assume that police routinely dismiss information coming from psychics as unreliable, but in fact police must follow up on all credible tips about crimes, including those from dubious sources. They routinely deal with liars, hoaxers, jailhouse informants with dubious motives, people with drug habits and mental illnesses, and so on. Police cannot simply ignore a lead or tip even when it comes from a psychic—after all, just because a person claims to be psychic doesn't mean that he or she may not have some real knowledge of a crime (Radford 2010).

Of course it depends on what, exactly, our hypothetically accurate psychic told police: Did she or he say, "There will be a bombing in Boston in 2013," or "There will be a bomb at the Boston marathon finish line, and the name Tsarnaev is somehow connected," or something else? Psychics and psychic detectives often claim to give the names, detailed physical descriptions, ethnicities, and countless other "specific" descriptors of wanted murderers, terrorists, and abductors to police. It is not unreasonable to assume that, out of the tens of thousands of self-proclaimed psychics in North America and

(Continued on page 11)

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around the world, one or more of them with genuine precognitive psychic abilities would provide useful information about the bombers.

In fact, I've encountered dozens of cases where police have followed up on even vague information from psychics. For example, in March 2004 a psychic told the Transportation Security Administration (TSA) that a bomb was aboard an American Airlines flight leaving Florida and bound for Dallas, Texas. The psychic's bomb report resulted in a pre-boarding search by the TSA and Port Authority police; despite a thorough examination with both equipment and bomb-sniffing dogs, nothing suspicious was found. The delay forced cancellation of the flight. Doug Perkins, local administrator for the TSA, said that the psychic's information was taken seriously because "…we can't ignore anything. We want to take the appropriate measures."

In 2011, the Texas police, FBI, and Texas Rangers mobilized the massive search of a remote farm based on a tip from a psychic that mass graves would be found there. There have even been cases where the FBI has actually enlisted psychics in their investigations, such as in the 1996 crash of TWA Flight 800 near Long Island (see Radford 1999).

Boston Bombing Suspects

With that background, what do we know about law enforcement's knowledge about Tamerlan and Dzhokhar Tsarnaev, the two accused Boston bombers? Quite a bit: In October 2011, America's main counterterrorism agency, the National Counterterrorism Center, added Tamerlan Tsarnaev's name to two different government watch lists, also alerting other agencies including the FBI and its Terrorist Screening Database, the State Department, the TSA, and the Homeland Security Department. We know that Tsarnaev's name was still on a watch list as of January 12, 2012, when his flight reservation to Russia flagged a security alert (Schmitt and Schmidt 2013a).

I respectfully disagree that psychics are damned if they do make accurate predictions and damned if they don't. The problem is that they don't.

In fact, the FBI dispatched two counterterrorism agents to interview Tsarnaev and his family in 2011 but found no evidence of terrorist activity, leaving the case dormant. "At that point, [an FBI] official said, 'you would need additional information, like a follow-up request'" (Schmitt and Schmidt 2013b) for information or some other reason to look again at Tsarnaev as a possible threat.

Which brings us back to the question of whether or not information from a psychic would have been taken seriously by authorities and investigated—possibly preventing the attack in the first place. It seems almost certain that if police had been given reasonably specific, accurate information about one or both of the Tsarnaev brothers (by a self-proclaimed psychic or anyone else) that someone would have taken a few seconds to enter that information in a computer system where the information had already been flagged. This is especially true given that the information would have been passed along to the FBI counterterrorism unit in Boston—the same agency that had previously investigated Tsarnaev only a year earlier, and whose agents were familiar with his profile. Any actionable information would almost certainly have been at least briefly checked. And the information need not have been made public, avoiding the issue of scaremongering.

So it's unlikely that a psychic who (correctly or incorrectly) predicted a terrorist attack would be ignored or dismissed—especially if he or she could point to a history of verified, accurate predictions. If the information is vague (such as "a bomb might go off in Boston around mid-April"), then of course it's likely that the information will be ignored. But if the information is specific enough to follow up on (what's called "actionable intelligence," such as names, dates, locations, and profiles), then it's very likely that the information would indeed be taken seriously and investigated.

My answer is yes: I think that in this case, and many others, if police had been given useful information about the Boston attacks by psychics, it likely could have been prevented. I respectfully disagree that psychics are damned if they do make accurate predictions and damned if they don't. The problem is that they don't—and if they did I'd be the first person encouraging law enforcement to use them to solve crimes and prevent terrorism. Anything else is simply making excuses for failure. ■

References

Radford, Benjamin. 1999. FBI enlisted psychic in TWA 800 investigation. Skeptical Inquirer (July/August).

———. 2010. The psychic and the serial killer: Investigating the 'best case' for psychic detectives. Skeptical Inquirer (March/April).

Schmitt, Eric, and Michael S. Schmidt. 2013a. Slain Boston bombing suspect was placed on two federal watch lists in 2011. *The New York Times* (April 24): A16.

———. 2013b. Officials say they didn't have authority to monitor suspect. *The New York Times* (April 23): A13.

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Mind Over Metal

Can people move or alter physical objects simply by using a hidden power of the mind called psychokinesis? I have encountered many claims of such powers in the course of my work (since 1969) as a paranormal investigator. And I have pretended to have such ability myself—both as a professional stage magician and mentalist (a magician specializing in apparent psychic feats). In the fall of 2012, I attended a workshop that enabled me to investigate the latest popular expression of psychokinetic metal bending.

Psychokinesis

The term *psychokinesis* (formerly *telekinesis*), or PK, derives from the Greek words for "mind" and "motion." Together with extrasensory perception (ESP), it constitutes what parapsychologists refer to as "psi" to describe the two seemingly closely related phenomena. However, the existence of psi has never been proven and, indeed, according to a sympathetic source: "Despite decades of research, psi continues to elude physical and quasi-physical theories of how it functions; it operates outside the bounds of time and space" (Guiley 1991, 468).

PK describes the alleged power of mind over matter, including such "micro-PK" acts as subtly influencing how thrown dice will land, or "macro-PK" feats like levitating a table or producing so-called "poltergeist" effects (actually, typically the tricks of children[1]). Psychokinetic metal bending is another alleged macro-PK phenomenon.

Figure 1. Uri Geller seemed able to bend keys and cutlery with his thoughts. (Drawing by Joe Nickell)

Geller the PK Marvel

It appears that the first major performer of apparent PK metal bending (PK-MB) was Israeli-born former fashion model and nightclub magician, Uri Geller (b. 1946) (Figure 1). Claiming to be guided by super beings from a distant planet, Geller appeared to read minds, bend keys and cutlery with PK, see while blindfolded, and perform other feats—all of which skilled magicians easily duplicate. (I, for example, have driven a car while blindfolded [Nickell with Fischer 1992, 77].) He typically refused to perform when magicians were observing but, nevertheless, was occasionally caught cheating.

Renowned American magician and psychic investigator James "The Amazing" Randi once observed Geller up close. Posing as an editor when Geller performed in the offices of *Time* magazine, Randi saw the simple tricks behind Geller's wonderworking. For example, while Geller pretended to cover his eyes as a secretary made a simple drawing, he actually peeked, thus enabling him to appear to read her mind and reproduce the drawing. Again, while supposedly bending a key "by concentration," Geller had instead bent it against a table when he thought he was unobserved. (For more on Geller's methods, see Randi 1982.)

More Benders

Geller was soon imitated by other "psychics" who discovered that they, too, could bend keys and spoons. One was Judy Knowles, who impressed London physics professor and parapsychologist John Hasted with her apparent ability. Hasted invited James Randi to observe tests of Knowles in a lab at Bath. Randi arrived with colleagues and his checkbook, offering Ms. Knowles $10,000 if she successfully passed the test, which was designed by Harry Collins of the University of Bath. Collins had tested other spoon benders, but none had been successful, and some children had been caught cheating.

Briefly, the test involved Knowles holding the spoon in a single hand rested on a table before a two-way mirror. Observers, equipped with a video

camera, were on the opposite, see-through side of the mirror. A candle was used to blacken the bowl of the test spoon so that, if one attempted to cheat—using the thumb to press against the bowl and so cause bending—the attempt would be revealed by the resulting smudging. Knowles tried unsuccessfully to bend the spoon using PK, but after nearly two hours, she quit the test. Randi and colleagues concluded Knowles had been unsuccessful, while Hasted and associates called the results "inconclusive" (Randi 1978, 36–39).

In the early 1980s, two young Americans, Steve Shaw and Mike Edwards, convinced parapsychologists at a psychical research laboratory in St. Louis, Missouri, that they could use their PK powers to move objects and bend metal under test conditions. In 1983, however, the duo revealed that they had perpetrated a hoax—now known as Project Alpha. Having worked secretly with James Randi, they demonstrated that credulous scientists could be fooled like anyone else (Shaw 1996, 617–18; Randi 1995, 253–54). Shaw has gone on to become the internationally acclaimed mentalist Banachek.

As a colleague and friend of Banachek, I have seen his metal-bending effects firsthand many times, especially at one of his workshops for fellow magicians and mentalists (Amherst, New York, June 16, 2009). His remarkable fork bend, whereby the tine of the fork is seen to visibly bend without being touched, is superior to any of Uri Geller's effects—according to no less an authority than the late skeptic and magician Martin Gardner (Shaw 1996, 615).

Evolutionary Phenomenon

PK metal bending has evolved over time. As we have seen, performers appeared to bend metal by simply looking at it or stroking it lightly. Sometimes they even allegedly bent metal remotely. The performer might suggest, for instance, that people's keys have mysteriously bent in their pockets or purses. In fact keys may become accidentally bent in various ways (as by the key being used in haste so that the partially inserted key is turned in the lock prematurely). Such an already bent key may go unnoticed until the performer calls attention to it (Shaw 1996, 619).

Major claimants of PK-MB were—in addition to Uri Geller—Jean-Pierre Girard (France), Masuaki Riyota (Japan), and Stephen North (England), as well as another Israeli, Ronni Marcus. (In 1994, *Unsolved Mysteries* asked me to observe Marcus's act at a conference. However, a producer subsequently called to say that the conference organizers had refused to allow me to participate, and the TV show therefore withdrew its interest. I attended anyway, undercover, but Marcus was a no-show amid revelations he had been caught cheating in California and had returned to Israel [Randi 1994].)

Figure 2. Ron Nagy teaches well-attended workshops in "PK" spoon bending at Lily Dale spiritualist village. (Photo by Joe Nickell)

Soon, honest magicians and mentalists got into the act, demonstrating that very convincing PK-MB effects could be produced by trickery. The inescapable inference was that perhaps the "real" effects were accomplished by tricks also. Among various shared secrets, some were sold through magic supply houses, including Mark Walker's book *Key Bending* (which also gave secrets to bending cutlery) (Abbott's 1987, 337). Top-flight demonstrators of the magic art of pseudo PK-MB are James Randi and Banachek.

Later, laypeople began to try their hand, quite literally. Beginning in the 1980s, at metal-bending parties and workshops attendees began surprising themselves with their newfound PK-MB abilities. They typically bent spoons with their hands while insisting they did not exert sufficient force to cause the extent of bending achieved. What was going on?

Hands-On

On the evening of August 23, 2012, my wife, Diana, and I showed up at a workshop in Lily Dale, a tiny village in Western New York that represents the world's largest spiritualist community. The session was conducted by Ron Nagy, curator of the Lily Dale Museum and an old friend (Figure 2). In the spirit of openness he had invited me to attend, and we mutually agreed not to be adversarial. That is, he would not "out" me as a notorious skeptic, and I would not be troublesome.

The ad for the workshop defined psychokinesis as "the movement of objects without physical contact," then went on to promise:

> This workshop will explain the basic mind over matter aspects of bending metal objects and also explain how the mind and body can react together and cause harmonious health conditions. This workshop is intended to be fun and also provide experiences previously believed to be impossible that should reduce some of the artificial limits we have placed in our lives. It may seem remarkable that with very little training one might be able to accomplish this extraordinary proof that belief in spirit and mind over

Figure 3. Cutlery was bent by the author at a Lily Dale workshop. (Photo by Joe Nickell)

> matter is more powerful than certain realities. ("Spoon Bending" 2012)

For the next two hours, we held spoons (and occasionally forks) in our hands as we implored them to respond to our thoughts. To free our minds, Ron had us—acting in unison—jump in the air and turn around twice, while thinking the metal was bending. Sure enough, for all but one or two of the thirty or so participants, we achieved bending. I had especially good results. (See Figure 3.) Some participants seemed quite mystified.

Revelation

However, I could see early on that a positive attitude was helpful: Being confident that the spoon would easily bend helped overcome the negative first impression that the metal was resistant. Such is the power of positive thinking.

What I think really happens in such situations is that one simply exerts sufficient strength to cause the bending (I was even able to put spiral twists into the handle—again see Figure 3) while being somewhat distracted from the process. An ability to *dissociate* (to separate a mental activity from the main stream of consciousness) seems a definite asset, because the bending relies heavily on the *ideomotor effect* (the psychological phenomenon in which, unconsciously, one moves his or her hand sufficiently to affect dowsing rods, Ouija-board planchettes, and the like [Nickell 2012, 348–49]).

PK-MB partygoers have inadvertently described the very processes I have explained. One wrote, ". . . we needed to create an atmosphere of excitement and emotional arousal." The party host, an engineer named Jack Houck, "encouraged us to be noisy and excited." The writer added, "The only thing I noticed is that spoon bending seemed to require a focused attention. You had to try to get it to bend, and then you had to forget about it. Maybe talk to someone else while you rubbed the spoon. . . . If you kept watching the spoon, worrying over it, it was less likely to bend" ("Spoon Bending" 2013).

The ad for our workshop defined PK as occurring "without physical contact"; this means that PK was not demonstrated by the participants, since they had held the cutlery in both hands in the very way one would in order to deliberately bend it. But this workshop did not involve trickery. The only deception that seemed involved was self-deception. ■

Acknowledgments

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Note

For a discussion, see Nickell 2012, 325–31, 333–41.

References

Abbott's Catalog 23. 1987. Colon, Michigan: Abbott's Magic Manufacturing Co.

Guiley, Rosemary Ellen. 1991. *Encyclopedia of the Strange, Mystical & Unexplained*. New York: Gramercy Books.

Nickell, Joe. 2012. *The Science of Ghosts: Searching for Spirits of the Dead*. Amherst, NY: Prometheus Books.

Nickell, Joe, with John F. Fischer. 1992. *Mysterious Realms: Probing Paranormal, Historical, and Forensic Enigmas*. Amherst, NY: Prometheus Books.

Randi, James. 1978. Special report: Tests and investigations of three psychics. Skeptical Inquirer 2(2) (Spring/Summer): 25–26.

———. 1982. *The Truth About Uri Geller*. Buffalo, NY: Prometheus Books.

———. 1994. Ronnie at Berkeley. Online at www.mindspring.com/~anson/randi-hotline/1994/0010.html; accessed April 26, 2013.

———. 1995. *The Supernatural A-Z*. London: Brockhampton Press.

Shaw, Steve. 1996. In Stein 1996, 613–19.

Spoon Bending. 2012. Ad for workshop, *Lily Dale Assembly 2012 Program: Legacy of Love*, 47.

Spoon Bending. 2013. Online at http://www.uri-geller.com/mct27.htm; accessed February 12, 2013.

Stein, Gordon, ed. 1996. *The Encyclopedia of the Paranormal*. Amherst, NY: Prometheus Books.

[THINKING ABOUT SCIENCE MASSIMO PIGLIUCCI

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Mathematical Explanations and Degrees of Impossibility

Suppose you are the mother of three children. You are having a nice picnic with them and wish to divide up the strawberries in your basket equally, without cutting them (because you don't want to be messy). The problem is: there are twenty-three strawberries in your basket, which means that you cannot actually accomplish the feat you intended to accomplish. Why not? The explanation is mathematical, not just physical, and in some sense more fundamental than a physical explanation would be.

Or take another well-known problem, at least in philosophical circles. The formerly Prussian town of Königsberg (where Immanuel Kant was born and lived) has a number of bridges that go over a river and its fork in several places. Now, nobody has been able so far (nor is there any expectation that anyone will be able in the future) to cross all bridges in Königsberg exactly once while remaining either on land or on a bridge (i.e., without using boats) and while always completing the crossing of a given bridge once he started to walk on it. Why not? Because—as philosopher Marc Lange explains in a 2012 paper that appeared in the *British Journal for the Philosophy of Science*—the bridges of Königsberg are arranged as a particular type of network that makes it impossible to accomplish that feat. Again, the explanation for the failure is distinctively mathematical, not physical.

The reason I am bringing this up is because skeptics are very aware of what philosophers refer to as the "modality" of science, but they tend to be somewhat more oblivious to other forms of modality, such as logical or mathematical. Modality, in philosophy, refers to the necessity of certain things. So for instance, the law of conservation of energy makes perpetual motion machines physically (modally) impossible. That is, there is no way to build perpetual motion machines without violating a fundamental law of physics. This is why the U.S. Patent Office long ago stopped even considering applications for such machines, and it is also why the skeptic doesn't really have to empirically investigate claims of perpetual motion: we know a priori that they must be false because of the strong modality of the law of conservation of energy.

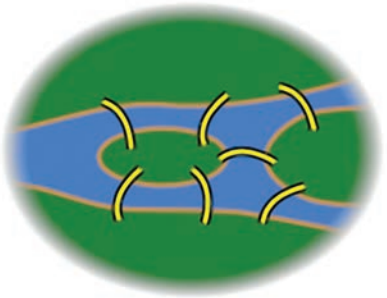

Figure 1. The bridges of Königsberg.

The idea that some philosophers have put forth, and that Lange nicely explores in the paper I've mentioned, is that there is a range of increasingly stronger modalities, where the physical one is, perhaps to the chagrin of "fundamental" physicists, actually the weakest. We have seen two examples of mathematical modality, in which the explanation of the physical impossibility of two tasks transcends physics itself, since under any set of laws of physics it would still be impossible to evenly distribute the twenty-three uncut strawberries among the three children, or to cross all of the bridges of Königsberg exactly once. Consider now Newton's second law of motion, another example brought up by Lange. The law is summarized by the simple mathematical equation $F = ma$, where F is the force acting on a body, m is its mass, and a is its acceleration. The interesting thing is that the law is independent of the specific causal framework within which a given force acts (it would hold, for instance, even if gravity followed an inverse cube, rather than an inverse square decay curve), which means that the modality (i.e., the necessity) of Newton's second law is stronger than that of other physical facts about our universe.

Or consider the principle of natural selection in biology. Its original Darwinian formulation was famously restated by geneticist Richard Lewontin in the 1970s in a way that transcends the specific substrate of biological organisms: *any* system characterized by random variation of its attributes, a correlation between those attributes and whatever measure of fitness applies, and a mechanism of inheritance of the fitness-related attributes across generations *must* evolve according to Darwinian principles. That is, the modality of Darwinian evolution is stronger than the one imposed by more contingent biological facts (such as that the genetic material of earthly organisms happens to be a type of nucleic acid).

The idea that Lange develops in his paper, then, is that there are different degrees of modality that we can use to understand why some things are possible and others impossible. That is, "possibility" and "impossibility" need to be qualified: something can be mathematically possible but physically impossible because the laws of physics of our universe just happen not to be structured in a causally conducive way. But if something is mathematically, or logically, impossible, then *no* set of physical laws could make it possible (i.e., mathematical and logical impossibilities are stronger than physical ones).

So, the next time we tell a purveyor of pseudoscientific notions that what he is proposing is "impossible," we would be well served by specifying which type of impossibility we are referring to. The higher we can reasonably go along Lange's sliding scale of modality, the more confident we can be of the impossibility of the extranormal phenomenon in question. Conversely, we need to be careful about throwing the word *impossible* around too casually, since it may turn out that a given phenomenon is merely contingently not true but doesn't rise to the lofty metaphysical level of being impossible. ■

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[NOTES ON A STRANGE WORLD MASSIMO POLIDORO

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The Mystery of the Sicilian Avengers

In eighteenth-century Sicily, there once was a group of mysterious men. By day, they would care for their businesses, but at night they would transform into a terrible sect, avengers of injustice and rectifiers of wrongs. Aristocratic and wealthy, they would protect the poor commoners and bring oppressors and tyrants to justice. They would wear black hoods and their identities were a mystery, even to each other. Their meeting point was in a place called "Cuncuma," an underground grotto in Palermo, where caves and tunnels could lead their vengeance everywhere it was needed. They were known as the Beati Paoli ("Blessed Pauls"), and whoever was found guilty of some infraction would tremble upon hearing their name.

The 'Sacred' Novel

These are, broadly speaking, the characteristics of the legendary sect of the Beati Paoli. It was a long history handed down in Sicily and told only orally until it was published in the form of a serialized novel in 1909. The author of the novel was Luigi Natoli, who signed with the pseudonym of William Galt and told the story in 239 episodes published daily by the *Giornale di Sicilia*.

Even before then, the story was told and repeated with such passion and care by the Sicilians that it became widely known among both the poor and the bourgeoisie. For the inhabitants of the Capo—the Palermo district where it was believed the sect would meet—Natoli's novel became almost a sacred text, read aloud every evening by the head of the family for relatives who listened to it in rapt silence. According to the historian Rosario La Duca: "In Sicily, the *Beati Paoli* is still the only book that a lot of ordinary people ever read in the course of their life." Yet very few outside Sicily have ever heard of it. But, above all, it is reasonable to ask whether the history of the Beati Paoli is just a legend or has any real historical basis.

Photo Credit: photos from the blog of Tommaso Aiello (http://tommasoaiello.com)

A portrait of Luigi Natoli by F. Camarda, 1934.

A Sect of the Wicked

A historian of ancient Palermo, Francesco Maria Emanuele Gaetani, Marquis of Villabianca, who lived at the end of the eighteenth century, was the first to discuss the Beati Paoli in writing. In his *Opuscoli palermitani*, the first text to mention the sect, he explains how in his days the Beati Paoli "were already a lost seed." That is, no one remembered them.

It was Gaetani who reconstructed their story, calling them first and foremost a "sect of wicked and capricious people called avengers" and tracing their origins back to 1185. From the Middle Ages, the sect would be continually renewed up until one of the most turbulent periods in the history of Sicily, the one that in Natoli's novel spans from 1698 to 1719.

It was an age of great contrasts, shaken by years of war and strong disagreements between church and state. Suffice it to say that during those twenty years, Sicily saw a succession of three monarchies. First the Spanish, with the accession to the throne of Philip V, the first Bourbon king of Spain, then with Vittorio Amedeo II of Savoy, and finally with the Austrian Charles VI of Habsburg.

In this climate, it was inevitable that the noble and powerful abused their powers at the expense of the weakest. The Justice of the State, where it was not absent altogether, was almost always at the service of the strongest; in addition, the same nobles often made use of thugs to quickly resolve those cases that they preferred not to subject even to the courts.

Here, then, according to Gaetani, the reason that gave birth to the Beati Paoli: "Poor people, not being able to

pay for a killer, summoned the pride to do wickedly for themselves with their own hands." It was not simply a form of personal justice but was managed by a body acting in the shadows and, therefore, by its nature elusive and in turn powerful.

Ancestors of the Mafia?

For the masses, the Beati Paoli were heroes and defenders of the oppressed, and Natoli paints them as such in his novel. Others, however, such as the nineteenth-century journalist Vincent Linares, considered them "wicked killers" who often acted for personal vendettas or to perform other common crimes. Also, according to Linares, the sect was eventually vanquished and scattered.

Photo Credit: photos from the blog of Tommaso Aiello (http://tommasoaiello.com)

Backboard of a Sicilian cart illustrating two episodes from the Beati Paoli stories.

There are those who want to see a link between the Beati Paoli and the modern mafia, seen here as a secret society. During a deposition, Mob repentant Tommaso Buscetta, a great admirer of Natoli's book, declared: "The mafia was not born today, it comes from the past. First there were the Beati Paoli, struggling with the poor against the rich…we have the same oath, the same duties." Another "pentito," Totuccio Contorno, called himself "Coriolanus Floresta," just as the hero of Natoli's novel did.

After the murder of Police Lieutenant Joe Petrosino, the enemy of Italian crime transplanted in the United States, who was killed in Palermo on March 12, 1909, the investigation brought to light that the mafia killers, responsible for the death of the Italian-American policeman, not only had already appropriated the myth of the Beati Paoli but had started to meet in a basement, just like in the legend of the ancient cult.

But this is just "embezzlement," according to historians. "The Mafia" says La Duca, "has its roots in the disintegration of the agrarian feudal structure of the island, which took place in the early nineteenth century, by which time the sect of the Beati Paoli had long gone." Natoli's book, therefore, would have unwittingly contributed to the apologetic feelings for the mafia. "The citizen of Palermo," says the scholar Francesco Paolo Castiglione, "is certain that in an unspecified age—as is always the case with historical references among common people—the oppressed had reached a precise awareness of their rights and were able to avenge the violence that they were forced to suffer. But clear indications show that, as long as the novelists did not start to build fanciful tales about literary Beati Paoli, the sect was not as mysterious as it was later considered, being sufficiently known both the character of political-military faction and the era in which it acted."

The Extant Secret Lair

Was it ever known who the Beati Paoli really were and where exactly they gathered? In his essay, Gaetani identifies only three members of the sect. About the first, Giuseppe Amatore, we only know that he was a "master scopettiere," that is a manufacturer of rifles, that he was called "u Russu" (the Red one) and that he was hanged in Palermo on December 17, 1704, at the age of twenty-seven. The second, Girolamo Ammirata, "rational by profession" (an accountant), was hanged on the Piazza del Carmine in 1723 for killing a man "with a stroke of carrubina."

Regarding the third one, Gaetani tells us that he had been able to meet him in person. He was a famous coach driver in Palermo, Vito Vituzzu, that Gaetani knew as a child and called "The last ruffian of the Compagnia de' Beati Paoli." Once he escaped the gallows, and with the cult dissolved, he was reduced to be the "church farmer," i.e., the sacristan, at St. Matteo al Cassaro.

As for the cave of their mysterious get-togethers, it was called the Cuncuma because in dialect "keep concùmiu" means "take counsel together, conspire."

Natoli describes the lair: "It was a sort of cave, dug into the tuff, with a circular dome on top; in the middle of the room there was a stone table; the man who gave orders would sit behind the table, his black hood was large and fully closed as the hooded brethren and would reach down to the middle of his chest."

According to Gaetani, the meeting place of the Beati Paoli was identified in an underground cavity in the neighborhood of the Capo, near the church of S. Mary of Jesus. Accessible through it, Gaetani wrote, was the home of the

lawyer Giovanbattista Baldi: "From the first floor of the entrance of the house, through a door, you arrive in a small open court in which there is a low tree, and the floor on which you walk is nothing else than the layer covering the cave below. In the center of the vault is an eye with an iron grate that serves as a crack and gives light to the underground cave." It then went down five stone steps and there you were in a room that overlooked the main cave, complete with seats carved into the rock and shelves "in which they placed their iron firearms."

The existence of this cave was confirmed in the late nineteenth century by the visit of a Palermo scholar, Vincenzo Di Giovanni, who found it, stating that in 1889 it was possible to access it through "the house of Baron Biandano in the Via Beati Paoli at no. 35." Today the Cuncuma is no longer accessible because the inputs were walled up, but after his visit Di Giovanni had a marble plaque put up on the building facade, which, in order to avoid any possible doubt, read: "The old headquarters of the Beati Paoli."

Caves and tunnels, in fact, are well known in the area and are part of a Christian cemetery complex developed in the fourth century CE, the natural bed of the river Papireto. "But popular imagination," says La Duca, who is also an expert on the topography of Palermo, "believed and still believes that each cavity present in the underground of the city or his neighbor's territory has been used by members of the secret society. The most unthinkable legends have then emerged and find a justifiable support in the presence, in the northwestern area of the vast territory of Palermo, of stone quarries in tunnels that are mostly empty and make the subsoil viable."

Photo Credit: photos from the blog of Tommaso Aiello (http://tommasoaiello.com)

A 1940s tableau used to illustrate in public the story of the Beati Paoli.

Myth and Reality

The story of the Beati Paoli inevitably moves between myth and reality. The same name of the sect, whose origins are not clear, is an example in itself. Giuseppe Pitrè, a nineteenth-century anthropologist who lived in Palermo, wrote: "Particularly lucky were considered those born on the night of St. Paul (June 29–30), as it was widely believed that they possessed supernatural virtues not shared by any other mortal. They are strong and prosperous, can handle snakes, vipers, and venomous reptiles of all kinds with impunity . . . can face the werewolves . . . know how to predict the future and are considered infallible oracles. It is likely, then, that since they were considered almost supernatural incarnations of the Apostle Paul, they gave the name to the sect of the Beati Paoli, whose members were also considered supernatural beings, both for the aura of mystery that surrounded them and the secrecy of their actions."

True or false, the Beati Paoli also entered common language. And if "having as much as the Beati Paoli" once meant to take a lot of beating, today in Sicily the phrase is another way of saying that one is a survivor. It seems, in fact, that during the day, the Beati Paoli went into churches pretending to pray the Rosary dressed as monks of St. Francesco di Paola (another possible origin for the name). It was actually a ploy in order to better learn the facts that happened in the town, and then, at night, they would plot and implement their revenges based on what they had heard. That is why, even today, in order to indicate a dangerous person who only appears to be good on the surface, you can hear in Palermo and the surrounding area the people say: "He is just like a Beato Paolo." ■

Acknowledgment

Many thanks to Fara Di Maio for helping in the research of material in the archives of Palermo.

Sheaffer's "Psychic Vibrations" column has appeared in the SKEPTICAL INQUIRER for more than thirty years; its highlights have now been published as a book (Create Space 2011). Sheaffer blogs at www.BadUFOs.com, and his website is www.debunker.com.

UFOs in the Desert, 2013

For the second year in a row, I attended the International UFO Congress near Phoenix, Arizona, the largest UFO conference in the world. What follows are some of the highlights of the conference. A much longer, five-part version of this report can be found on my blog at www.BadUFOs.com.

Ben Hansen, host of the *Fact or Faked* show on the SyFy Channel, spoke on "Profiling the Hoaxers." He explained that his background in law enforcement prepared him well for evaluating forensic evidence of UFOs and other "paranormal" evidence. He describes himself as neither a believer nor a skeptic but a "verifier." He explains that hoaxes abound in UFOlogy, and that there can be big money in making bogus ET claims, although he refused to name any names. He set forth several "Hoaxer Subtypes," including the charismatic Clinical Con Artist; Legendizers who seek fame and/or financial gain; Commercial Campaigners with publicity stunts; Self-Amused Pranksters motivated by the challenge of pulling it off; and Disinformation Agents—the rarest type and a category that sounds rather dubious to me.

Claims of persecution by federal agencies is a red flag of a charismatic hoaxer. When a story or a video is crafted to capture emotion, this is a sign of a hoax. You have to think like a movie director: if the crafting of a video appears to be planned out to demonstrate credibility, the video is dubious since a real UFO video would be taken without preparation or warning. Also, certain technical errors in the creation of a video reveal a hoax. Bigfoot videos tend to show the creature moving left-to-right much more than the opposite. Either Bigfoot walks in circles, or else it is staged to look this way. But Hansen believes that some Bigfoot sightings are valid, as he believes are some UFO sightings.

Stanley Milford and John Dover, who are current and retired (respectively) law enforcement for the Navajo Nation, spoke on "UFOs Over Native American Land" (the Congress itself takes place on an Indian reservation). These two officers headed up the Rangers' Special Projects Unit, which "managed the investigation of those cases that would be deemed 'paranormal,' such as witchcraft, Bigfoot sightings, hauntings, and UFO sightings," although these are only about one to two percent of the cases of Special Projects. In one incident, an elderly Navajo claimed that a brilliantly illuminated UFO circled his remote desert house. He then saw, looking out the window, four aliens walking around with flashlights. The Rangers also received reports of Bigfoot sightings and tracks, witchcraft, and Shapeshifters (similar to werewolves). Such beliefs, they explained, are prevalent on the reservation.

Grant Cameron, who has been active in UFO and paranormal research for almost forty years, spoke on "Consciousness and UFOs." He is convinced that no real progress in knowledge about UFOs will be made until we successfully contact the beings involved. Cameron's argument is basically that if you can show that the idea of mental contact with UFOs predates the earliest contactee, George Adamski, then you have shown that it is not derivative from that case. This argument is quite correct, even ingenious. But the problem is that even then you still haven't proven that the "contact" is real; all you've proven is that Adamski wasn't the first to make it up.

Micah Hanks, an author and researcher, talked about "The UFO Singularity." As our machines' artificial

intelligence continues to increase, futurists speculate that for precisely one moment of time their intelligence will equal ours—and then forever afterward, theirs will be greater. This, of course, has nothing to do with UFOs. Or does it? Hanks suggests that UFOs may represent a "post-singularity technology," probably originating here on Earth, that somehow "transcends temporality."

The venerable Leo Sprinkle, psychologist and pioneering UFO abductionist, spoke on "Memories of an ET Experiencer and Spiritual Pigtailer." Sprinkle has been hypnotically regressing supposed ET experiencers for over forty years and still looks vigorous and spry at age eighty-two. Only in recent years did Sprinkle reveal that he believes he is an ET experiencer himself. He also talked about reincarnation and his past lives.

The panel "Investigating UFOs" featured James Fox, Nick Pope, and Marc Dantonio and was hosted by Lee Speigel. If you have been reading Speigel's articles in *The Huffington Post*, you know that he has been receiving many purported UFO photos and videos, and he has been sending them to Dantonio for analysis. Marc Dantonio is MUFON's chief photo/video analyst and president of FX Models, a model-making and special effects company. Because he is an expert in special effects, it would be extremely difficult for a hoaxer to fool him. While Dantonio believes that some UFO cases are authentic, he is actually very skeptical of photos and videos. "We must remove all of the possible 'knowns,'" he said, and if it's a close correlation to something we already know, he concludes it is that. Then he said something that amazed me: "Lee, you haven't yet given me anything 'unknown.'" He says, "I am harsh on the data." Even when a witness insists "I know what I saw!" Dantonio tells them that his comments are directed toward the data—the photo or video—not toward what they saw.

Later in his own talk, Dantonio showed photos and videos that depict lens flares, aircraft operation, solar balloons, the blinking lights on a vehicle, a reflection on a windshield, blowing snow, a flock of geese, digital skywriting, a butterfly, and views of a tower from Google Earth. "The purpose is not primarily to debunk the footage but to illustrate that we must be very hard on the data in order to find the holy grail of UFOlogy." Amen, brother! But the reason he is not a total skeptic, he explained, is that about fifteen years ago he had a traumatic encounter event in which he awoke at night, paralyzed, and was menaced by terrifying creatures. Dantonio appears not to be familiar with the well-known phenomenon of sleep disorders known as hypnagogic and hypnopompic hallucinations, which account for a large number of "alien abduction" reports.

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Roger Leir and Steven Colbern spoke on "Alien Implants: The Tip of the Iceberg." Leir has performed sixteen surgeries to remove implants from alleged alien abductees. He says his Alien & Scalpel Research (A&S) is incorporated as a 501(c)(3) company, and does not charge for any of the surgeries. During his fifteenth surgery Leir says that the implant kept moving away from the scalpel. It broke into twelve pieces and one disappeared. Two days after removal, the remaining pieces reassembled themselves. A&S went to the man's house in full *Ghost Hunter* mode, with radio frequency scanners, magnetometers, and radiation detectors. Many anomalies were discovered, including a magnetic monopole (something sought more eagerly even than unicorns), and magnetized wood and plastic. However, the man's wife was in a "constant state of denial" about all this alien activity. Steve Colbern talked about the supposed alien implant removed during that surgery. It is similar in appearance to a meteorite and consists of carbon fiber nanotubes, a manufactured nanotechnology device of unknown purpose. Thirty-two trace elements were detected, including iridium, and meteoric iron. One magnetic pole of the object is stronger than the other (which I think makes it a magnetic monopole, as well).

On Friday evening there was a free skywatch hosted by Ben Hansen and sponsored by Night Optics USA, a Bushnell company. Their hope was to sell some very expensive night-vision equipment to UFO enthusiasts. People stood in line for their turn to personally look through the different night-vision devices. Meanwhile UFO skeptic James McGaha and I had brought our portable telescopes and offered views of Jupiter, the Pleiades, and the Orion nebula. On the big screen, a satellite or something was briefly noted, but nothing of UFOlogical significance was seen all night.

John Rao, the founder of Open Minds (sponsor of the UFO Congress) drove his UFO spotting vehicle to the evening skywatch. This ATV has been customized with dual cameras in the back. However, these are not astronomical cameras but instead are security cameras like those used by the Border Patrol to look for illegal border crossers; they do not have the resolution that is typical of astronomical cameras. The cameras picked up a round object that Rao suggested was an "orb." It slowly drifted from left to right across the screen, and he would repeatedly move it back to the left side again. It was obviously an out-of-focus star image, moving from east to west because the camera does not have celestial tracking to compensate for the rotation of Earth. I had a green laser pointer, and laid it against the edge of the camera. The beam pointed exactly to Epsilon Canis Majoris (Adhara), a star of magnitude 1.5 (brighter than the stars in the Big Dipper) due south about 25 degrees up. This was the orb. McGaha came by and figured out how to focus the image. When that was done, the "orb" shrank down to a pinpoint size.

Ben McGee spoke on "Galactic Deep Time, Xenoarchaeology, and the case for Physical Artifacts as 'First Contact.'" He is best known as the skeptic guy on National Geographic Channel's dreadful *Chasing UFOs*, which, I am happy to report, will not be renewed for another season. He has a spaceflight consulting company. McGee described the history of life on Earth in terms of "galactic years," the time required for one full rotation of our galaxy (220 million years). Hence "deep time" is important to think about in terms of the prevalence of ETI. Earth has had five major extinction events in the last 2.5 galactic years, and two within the last galactic year. So how long would a civilization last in our galaxy? If drastic extinction events are common, then an estimated 325 million planets would contain not an actual civilization but the ruins of one. Hence, xenoarchaeology, the study of artifacts from extraterrestrial civilizations, which would require different methods than conventional archaeology.

Fox explained that he had arranged to interview Buzz Aldrin about the UFOs that supposedly followed him to the moon, but Aldrin backed out at the last minute because he feared losing funding from Paul Allen for SETI.

The documentary film director James Fox, who was also on *Chasing UFOs* as "the believer" to Ben's "skeptic," described his work as a UFO documentary film producer (*Out of the Blue*, *I Know What I Saw*) as promoting the fulfillment of the public's "right to know" what is going on. Fox spent a great deal of time talking about and illustrating the news coverage that he has received, and he showed some examples of his "gorilla marketing" of his films (I suspect he meant "guerilla"). Fox explained that he had arranged to interview Buzz Aldrin about the UFOs that supposedly followed him to the moon, but Aldrin backed out at the last minute because he feared losing funding from Paul Allen for SETI. Fox announced that his next UFO documentary project was under way: *701—The Movie*. This, he says, is the number that the government does not want you to know—the number of Project Blue Book "unknowns." What Fox does not realize is that this number has already shrunk upon further analysis and is set to shrink still further (see Tim Printy's *Sunlite* at tinyurl.com/bqqp5py).

Of course there was the inevitable talk by Stanton T. Friedman, who promised "A New Look at the Cosmos," although very little in his talk was new. He began talking about scientific mistakes of the past. To Friedman, rejecting UFOs is another of science's great mistakes. He presented the equations of fusion, without working out the actual results of those equations as did Edward M. Purcell, proving that interstellar travel using nuclear fusion is preposterous. He termed SETI the "silly effort to investigate." After all, why look all across the cosmos for ETI when they're here right now?

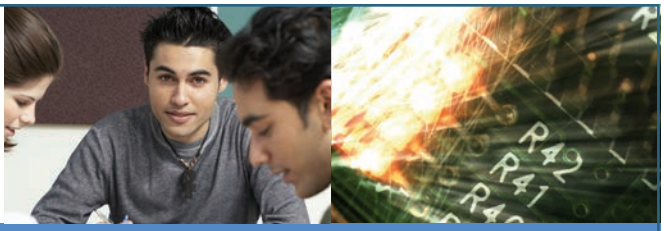
People say that if the government had UFO secrets, they would have leaked out by now. Friedman claims that governments *can* keep secrets, and for his example he cites the Corona spy satellite program of the early 1960s, that supposedly was unknown until it was declassified in 1995. BZZZZT—wrong answer! In 1971, Friedman's good buddy UFO skeptic Philip J. Klass, drawing upon what he learned in his work as senior avionics editor at *Aviation Week* magazine, wrote *Secret Sentries in Space* (Random House), which contains a detailed description of the then top-secret classified Corona program, explaining exactly what it is and how it works. Klass always insisted that if there were any government se-

crets about UFOs, he would have picked up on them long ago through his extensive network of sources. Friedman says that at least three out of over 100 supposedly leaked MJ-12 government UFO documents are authentic, meaning he concedes that some energetic hoaxer has produced the other 97 percent. I say it's 100 percent. We almost agree.

Interestingly, Friedman did not mention the Fish Map (a supposed extraterrestrial star map sketched by Betty Hill), but did go on about Zeta1 and Zeta2 Reticuli, the supposed home stars of the UFOnauts, according to that map. For reasons that make no sense, he still clings to Zeta1 and Zeta2 as the alleged home stars of the UFOnauts. Once you concede that the Fish Map pattern means nothing, then the Zetas mean nothing as well. Still, perhaps we should applaud Friedman for having taken baby steps in the direction of truth.

The talk by Alain Boudier was potentially the most significant and newsworthy of the entire Congress. Boudier said that his Aeronautical & Astronomical Association of France (3AF) is the most prestigious organization of its kind. It is not a government body but equivalent to the American Institute of Aeronautics and Astronautics (AIAA, which had its own flirtation with UFOs over forty years ago, and thankfully not since). The UFO report of the 3AF Sigma Commission is set to be released in a few months. This report, he promised, will be different than the "official" history of UFOs. It appears that the intent of the report is to push the entire UFO chronology back, before Arnold, to include the World War II–era. He talked about foo fighters, the Battle of Los Angeles, and some pre-Arnold sightings in the Pacific before moving on to Roswell, which he accepts as a genuine alien crash. The report's conclusions were that the U.S. military made its first UFO crash retrievals in 1941 (by the Navy, off the coast of San Diego), and on February 26, 1942 (by the Army, in the San Bernardino Mountains). Supposedly a document from FDR mentions the retrievals. The U.S. formed an "Interplanetary Phenomena Unit" to manage these retrievals. This allowed the development of otherwise-unknown technology, which he suggested was used to defeat Japan. You heard it right, folks: reverse-engineered alien technology was used to build the atomic bomb. ■

SCIENCE AND THE PUBLIC



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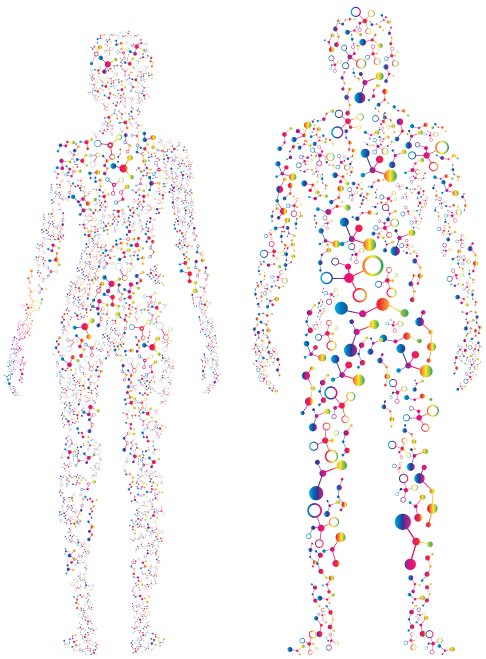
Why Gay and Lesbian? A New Proposal

The persistence of homosexuality among certain animal species, including humans, has bewildered scientists at least since the time of Darwin. Why should same-sex attraction persist when evolution assumes reproductive success? Does homosexuality—especially among humans—facilitate the intergenerational transfer of genetic material in some other way? Or perhaps it advances an entirely different objective that justifies its more obvious procreative disadvantage. Such questions have long attracted gene-based explanations.



Consider "kin selection," for example. As E.O. Wilson first suggested in 1975, maybe human homosexuals are like sterile female worker bees that assist the queen in reproduction. One study of homosexual men, known in Independent Samoa as *fa'afafine*, revealed that gays are significantly more likely than straight men to help their siblings raise children.

But statistical significance isn't the standard here. To satisfy the kin selection hypothesis, each gay must account for the survival of at least two sibling-born children for every one he fails to reproduce—no doubt, a difficult benchmark to attain. In any event, relevant studies in the United States and United Kingdom have so far failed to provide such evidence.

As a possible explanation for male homosexuality, other researchers have offered the "fertile female" hypothesis. Here, a genetic tendency toward androphilia, or attraction to males—though problematic for men from an evolutionary perspective—is thought to enhance the reproductive success of their straight, opposite-sex relatives by rendering them hypersexual.

At least two studies have claimed results in support of the fertile female model, which some researchers find appealing for a second reason. It is also capable of explaining why homosexuality persists at a constant but low frequency of no more than 8 percent in the general global population.

A former faculty member at Harvard Medical and the Salk Institute, British neuroscientist Simon LeVay favors instead evidence suggesting a suite of several "feminizing" genes (LeVay 2011). The inheritance of a limited number of these genes, LeVay suggests, will make males, for instance, more attractive to females—and thus presumably more successful in terms of reproduction—by rendering them less aggressive and more empathetic, for example.

But nature makes mistakes, of course. A few men in the family tree will inevitably receive "too many" feminizing genes and, as a result, be born gay. Indeed, one Australian study discovered that gender-atypical traits do tend to enhance reproduction. In this sample, heterosexuals with homosexual twins claimed to achieve more opposite-sex partnerships than heterosexuals without homosexual twins—though statistical significance was observed only among females.

Even so, most contemporary explanations are not based solely in genetics. Evidence suggests as well, for example, that a variety of mental gender traits are shaped during fetal life by varying levels of circulating sex hormones. Especially during certain *critical periods* of development, testosterone (T) levels in particular are thought to cause the brain to organize in a more masculine or feminine direction and, later in life, to influence a broad spectrum of gender traits, including sexual preference.

For instance, women suffering from congenital adrenal hyperplasia (CAH) due to elevated levels of prenatal T and other androgens are known to possess gender traits significantly shifted toward masculinity, including lesbianism. Importantly, female fetuses most severely affected by CAH and, thus, most heavily exposed to prenatal androgens are the most likely to experience same-sex attraction later in life.

Similarly, the bodies of male fetuses afflicted with androgen insensitivity syndrome—a condition in which the gene coding for the androgen receptor has mutated—fail to react normally to circulating T. As a result, these XY fetuses will later appear as girls and, as adults, share an attraction to men. To summarize, although a number of other factors could be, and likely are, at play, it is now fairly well established that prenatal androgen levels have a substantial impact on sexual orientation in both men and women.

But three researchers working through the National Institute for Mathematical and Biological Synthesis have recently combined evolutionary theory with the rapidly advancing science of both androgen-dependent sexual development and molecular regulation of gene expression to propose a new and provocative *epigenetic* model to explain both male and female homosexuality (Rice et al. 2012).

According to lead author William Rice at the University of California, Santa Barbara, his group's hypothesis succeeds not only in squaring homosexuality with natural selection but also explains why same-sex attraction has been proven substantially heritable despite two powerful and confounding facts. One, numerous molecular studies have so far failed to locate associated DNA markers and, two, concordance between identical twins—about twenty percent—is far lower than genetic causation might predict.

At the new model's heart are sex-specific epigenetic modifications, or *epi-marks*. Generally speaking, epi-marks can be characterized as molecular regulatory switches attached to the backbones of genes that direct how, when, and to what degree genetic instructions are carried out during an organism's development. They are created anew during each generation and are almost always "erased" between generations.

Although a number of other factors could be, and likely are, at play, it is now fairly well established that prenatal androgen levels have a substantial impact on sexual orientation in both men and women.

But because epi-marks are produced at the embryonic stem cell stage of development—prior to division between soma and germline—they can, in theory, be transmitted across generations. Indeed, some empirical evidence does suggest that on rare occasions (though not at scientifically trivial rates) they will indeed carry over and thus mimic the hereditary effect of genes.

Under typical circumstances, Rice instructs, sex-specific epi-marks serve our species' evolutionary objectives quite well by canalizing subsequent sexual development. In other words, they protect sexually essential developmental endpoints by buffering XX fetuses from the masculinizing effects and XY fetuses from the feminizing effects of fluctuating *in utero* androgen levels. Significantly, each epi-mark will influence some sexually dimorphic traits—sexual orientation, for example—but not others.

According to the group's model, however, when sex-specific epi-marks manage to escape intergenerational erasure and transfer to opposite-sex offspring, they become *sexually antagonistic* (SA) and thus capable of guiding the development of sexual phenotypes in a gonad-discordant direction. As such, Rice hypothesizes, "homosexuality occurs when stronger-than-average SA-epi-marks (influencing sexual preference) from an opposite-sex parent escape erasure and are then paired with weaker-than-average *de novo* sex-specific epi-marks produced in opposite-sex offspring."

To summarize, Rice's team argues that differences in the sensitivity of XY and XX fetuses to the same levels of T might be caused by epigenetic mechanisms. Normally, such mechanisms would render male fetuses comparatively more sensitive and female fetuses relatively less sensitive to exposure. But if such epigenetic labels pass between generations, they can influence the progeny's sexual development as well. And if they pass from mother to son or from father to daughter, sexual development can proceed in an atypical manner. In those very exceptional cases, offspring brain development can prog-

ress in a fashion more likely to result in homosexuality.

Rice's observations and insights are fascinating, to say the least. Indeed, popular news reports have described a scientific community highly appreciative of the new model's theoretical power. But of course a great deal of criticism has been tendered as well.

LeVay, for example, describes the authors' hypothesis generally as "a reasonable one that deserves to be tested—for example by actual measurement of the epigenetic labeling of relevant genes in gay people and their parents." Nevertheless, the new model is in fact "pure speculation," LeVay told me, and it never should have been reported—as some media have done—so grandiosely as "the cause" (or even as "a cause") of homosexuality.

More specifically, LeVay offers three points of caution. First, he warns that an epigenetic explanation is not to any degree implied from the current data on fetal T levels. When based on single measurements, he concedes, male and female fetuses may indeed show some overlap. But because T levels fluctuate throughout development in both males and females, allegedly anomalous individuals might easily average completely sex-typical T levels over time.

Second, LeVay sees "little or no evidence" that epi-marks ever escape erasure in humans.

Finally, LeVay continues to favor genetic explanations. The incidence of homosexuality in some family trees, he says, is more consistent with DNA inheritance than with any known epigenetic mechanism. Moreover, he warns, we should never underestimate the difficulty of identifying genetic influences—especially with regard to mental traits. In such cases, complex polygenic origins are far more likely to be at play than any single, magic genetic bullet.

Other neuroscientists have posed equally important questions. How can we test whether the appropriate epi-marks—probably situated in the brain—have been erased? Is it too simplistic to suggest identical or even similar mechanisms for both male and female homosexuality? Why is it important to isolate the specific biological causes of same-sex attraction? By doing so, do we run the risk of further stigmatizing an already beleaguered population?

LeVay continues to favor genetic explanations. The incidence of homosexuality in some family trees, he says, is more consistent with DNA inheritance than with any known epigenetic mechanism.

Rice doesn't deny his new model's data deficit. Nor does he portray the epigenetic influence on same-sex attraction as an exclusive one. His team does, however, insist that epigenetics is "a probable agent contributing to homosexuality." We now have "clear evidence," they maintain, that "epigenetic changes to gene promoters . . . can be transmitted across generations and . . . can strongly influence, in the next generation, both sex-specific behavior and gene expression in the brain."

The authors contend as well that their hypothesis can be rapidly falsified because it makes "two unambiguous predictions that are testable with current technology." Prediction one: Future large-scale association studies will not identify genetic markers correlated with most homosexuality. Any such associations found, they say, will be weak. Prediction two: Future genome-wide epigenetic profiles will distinguish differences between homosexuals and non-homosexuals, but only at genes associated with androgen signaling or in brain regions controlling sexual orientation. Testing this second prediction, they confess, can proceed only with regard to lesbianism by comparing profiles of sperm from fathers with and without homosexual daughters.

To my knowledge, Rice and his colleagues have never squarely addressed the question of whether, for philosophical or sociological reasons, we should refrain from delving further into the dicey subject of same-sex attraction. Negative responses, I would argue, expose both a tendency toward communal repression of individual thought and a fundamental disrespect for the scientific enterprise. Such decisions should always be left to the scientists and those who fund them. After all, it was science—not social concern—that confirmed the predominance of biology as the basis of homosexuality in the first place. ■

References

LeVay, Simon. 2011. *Gay, Straight, and the Reason Why: The Science of Sexual Orientation*. New York: Oxford University Press.

Rice, W., U. Friberg, and S. Gavrilets. 2012. Homosexuality as a consequence of epigenetically canalized sexual development. *The Quarterly Review of Biology* 87(4): 343–368.

THE CHELYABINSK EVENT OF FEBRUARY 15, 2013

On February 15, 2013, the million inhabitants of the central Russian city of Chelyabinsk experienced a half-megaton explosion from a disintegrating space rock. What happened, and how did the people of Chelyabinsk react?

DAVID MORRISON, ALAN HARRIS, and MARK BOSLOUGH

Xinhua News Agency

SHORTLY AFTER SUNRISE ON February 15, a projectile entered the atmosphere over the Ural Mountains travelling at more than eighteen kilometers per second. It was about twenty meters (sixty feet) in diameter, or half the diameter of the famous Tunguska impact of 1908, which flattened a thousand square miles of Siberian forest. The rocky projectile, which came from the asteroid belt, left a trail of smoky condensation across the sky as it vaporized in the atmosphere. Its terminal explosion, at an altitude of twenty-three kilometers, released energy equivalent to a couple dozen Hiroshima-sized atom bombs. When it exploded, the bolide (a very bright meteor that explodes in the atmosphere) was for a few seconds brighter than the sun. About two minutes later the shock wave reached the ground in Chelyabinsk, breaking windows and injuring about 1,500 people from flying glass and other debris.

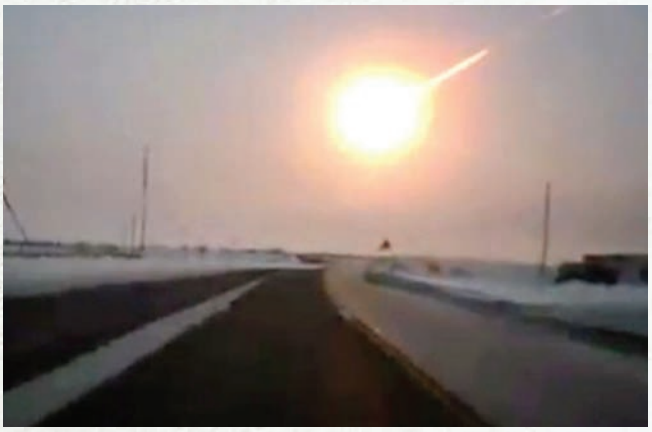
There was no advance warning of this asteroid strike. With a diameter of twenty meters (twenty meters is the best current estimate of the diameter, based on the mass that would produce the ~0.5 MT energy of the bolide), the Chelyabinsk impactor was smaller than most asteroids that have been detected by the telescopes of the NASA

Spaceguard Survey, which focuses on finding asteroids of about one hundred meters or larger. Furthermore, since it approached Earth from very near the direction of the sun, it could not have been seen by a ground-based optical telescope of any size. It therefore struck without warning, although the atmospheric explosion was measured by down-looking surveillance satellites. The Chelyabinsk bolide had about a tenth of the energy, and exploded more than twice as high, as Tunguska. The blast energy was directed more sideways that downward. These factors resulted, thankfully, in much less damage on the ground.

The explosion also produced a shower of stony meteorites, of a type common among the asteroids (ordinary chondrite). These meteorites, distributed over an impact region more than one hundred kilometers long, were easily collected by local people because most fell on snow, leaving obvious little "entry wounds."

Perhaps most surprising is what did *not* happen: There was no panic reaction that this was a nuclear attack. As far back as 1981, geologist Gene Shoemaker and others had warned that an unexpected cosmic impact might be misinterpreted as an attack and trigger a nuclear exchange. This fear has hovered over all subsequent studies of the impact hazard. Perhaps it was a legitimate concern during the Cold War, and maybe this is still a danger if a cosmic impact took place over the disputed territory of nuclear-armed antagonists such as India and Pakistan. Chelyabinsk is near the heart of the Soviet defense industry, surrounded by facilities that design and build nuclear weapons and rocket delivery systems. Those with long memories may remember that this area was the target of the 1960 U-2 flight of Gary Powers that was shot down by a Soviet missile. Yet apparently neither the Russian military nor the public associated the event of February 15 with a nuclear attack. For this we can all breathe easier.

The people of Chelyabinsk initially did not know what hit their city. Videos show that the brilliant light passing across the sky was ignored by most people, with traffic flow unaffected. We would have expected drivers to pull to the side of the road and get out to look at the trail of the bolide stretching across the sky, but this is not what the videos show. When the shock wave hit it was unexpected. Many people were injured because they went to the windows to see what was happening. In at least one case a teacher initially told her students to "duck and cover," the old Cold War–drill. They hid under their desks, but when nothing happened they got up and went to the window just in time for the shock wave. Photos of the damage showed that in many office and apartment buildings, only a few



Nikulin Vyacheslav/Itar-Tass Photos/Newscom

Perhaps most surprising is what did *not* happen: There was no panic reaction that this was a nuclear attack.

windows were blown out, while most remained intact. Many of the videos of the fireball posted on the Internet were taken from automatic auto dashboard cameras, or dashcams, installed by drivers in Russia to defend against insurance fraud or police corruption in case of an accident.

The response from the scientific community was quick. Scientists have been studying the impact hazard for two decades, and they are well connected by the Internet. In addition, many residents of Chelyabinsk began posting YouTube videos within an hour after the event. Within a few hours, the cause of the explosion was identified as the stratospheric disintegration of an incoming rocky object. The initial Russian news reports speculated that the asteroid was only a few meters in diameter and the energy was only a few tens of kilotons. However, the data from a worldwide network of atmospheric pressure sensors and seismic stations quickly established the energy of the explosion as between 300 and 500 kilotons. The response from the U.S. orbital monitoring system was also remarkably fast. Three days after the event they released the exact time and location, with measurements of the bolide track and its altitude (about 23 km) and velocity (more than 18 km/s) at peak brightness.

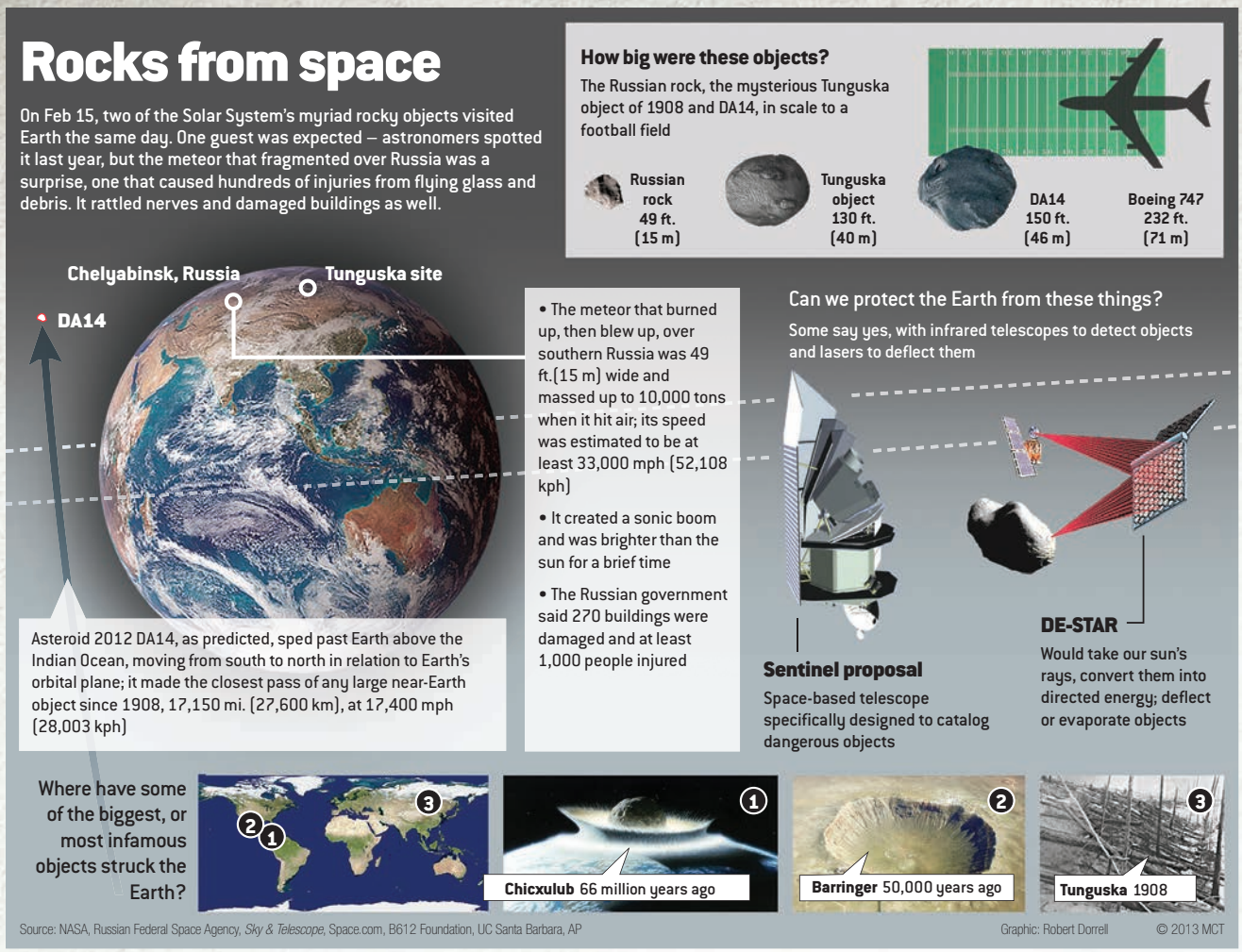
Fortunately, there seem to have been few suggestions that this was an unnatural event such as a UFO, or the product of some secret weapons system. Such stories continue to circulate about Tunguska, even a century after it happened. For a couple of days there were claims that the object was a comet rather than an asteroid. In part these came from the misunderstanding that the white trail left by the impactor was made of water droplets analogous to an airplane contrail, rather than ablation from the rocky object. Also, for the past century many Russian scientists have persisted in claiming that the Tunguska impactor was a comet, even after most other scientists abandoned that idea in favor of a rocky asteroid.

A curious aspect is the fact that February 15 was also the date of the closest passage by Earth of a 30–40 meter asteroid called 2012 DA14. It flew just 28,000 km above the Earth's surface. This remarkable coincidence seemed to call for an explanation, and many press stories suggested that the two objects were traveling together in space or were somehow related. The question of whether a "coincidence" is the result of truly correlated events or just chance is a familiar theme to skeptics.

Nature has provided us with several lines of evidence that the two events were not related. Immediately following the event, meteor expert Peter Brown of the University of Western Ontario checked radar meteor data to see if the Earth had experienced unusual meteor activity due to passage through a stream of debris associated with either 2012 DA14 or the Chelyabinsk bolide, and found none. Richard Binzel of MIT, who studies physical characteristics of asteroids, noted that the spectrum of 2012 DA14 implies a composition of the asteroid radically different from the composition of the recovered meteorites from the Chelyabinsk event. William Bottke of the Southwest Research Institute in Boulder, an expert on the evolution of asteroid orbits, noted that 2012 DA14's orbit is probably the result of numerous close encounters with Earth and other inner planets, whereas the orbit of the Chelyabinsk asteroid was a relatively "fresh" transfer orbit from the main belt. Last and perhaps most

KRT/Newscom

Coauthor Mark Boslough (at right), visiting the lab of Prof. Viktor Grokhovsky at Ural Federal University in central Russia, displays one of the largest recovered pieces of the Chelyabinsk meteor explosion. Boslough, a noted impact physics expert from Sandia National Laboratories (and a CSI Fellow), flew to Chelyabinsk shortly after the bolide explosion and participated in a PBS *NOVA* documentary, "Meteor Strike," about the historic event. It aired March 27, 2013, less than six weeks after the blast. Photo courtesy of Mark Boslough. Left photo, a resident cleans up some of the damage from the explosion.


Rocks from space
On Feb 15, two of the Solar System's myriad rocky objects visited Earth the same day. One guest was expected – astronomers spotted it last year, but the meteor that fragmented over Russia was a surprise, one that caused hundreds of injuries from flying glass and debris. It rattled nerves and damaged buildings as well.
How big were these objects?
The Russian rock, the mysterious Tunguska object of 1908 and DA14, in scale to a football field
Russian rock 49 ft. (15 m)
Tunguska object 130 ft. (40 m)
DA14 150 ft. (46 m)
Boeing 747 232 ft. (71 m)
Chelyabinsk, Russia
Tunguska site
DA14
Asteroid 2012 DA14, as predicted, sped past Earth above the Indian Ocean, moving from south to north in relation to Earth's orbital plane; it made the closest pass of any large near-Earth object since 1908, 17,150 mi. (27,600 km), at 17,400 mph (28,003 kph)
• The meteor that burned up, then blew up, over southern Russia was 49 ft.(15 m) wide and massed up to 10,000 tons when it hit air; its speed was estimated to be at least 33,000 mph (52,108 kph)
• It created a sonic boom and was brighter than the sun for a brief time
• The Russian government said 270 buildings were damaged and at least 1,000 people injured
Can we protect the Earth from these things?
Some say yes, with infrared telescopes to detect objects and lasers to deflect them
Sentinel proposal
Space-based telescope specifically designed to catalog dangerous objects
DE-STAR
Would take our sun's rays, convert them into directed energy; deflect or evaporate objects
Where have some of the biggest, or most infamous objects struck the Earth?
1
2
3
Chicxulub 66 million years ago
Barringer 50,000 years ago
Tunguska 1908
Source: NASA, Russian Federal Space Agency, Sky & Telescope, Space.com, B612 Foundation, UC Santa Barbara, AP
Graphic: Robert Dorrell
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Note: This graphic is from another source and contains several relatively minor inaccuracies, but we nevertheless felt it useful. —Editor

compelling, the direction of arrival of the two objects was radically different. 2012 DA14 approached Earth from an extremely southerly direction, and it would be impossible for another object in a similar orbit to hit Earth in the far northern hemisphere over Russia. The Chelyabinsk asteroid approached from the east.

Humans are hardwired to see patterns and causal relationships, and when we witness such an unlikely coincidence it can be hard to accept it as such. Within a few hours of the Russian event, there was speculation on Facebook that NASA was at fault, that 2012 DA14 had undiscovered companions, and that as the Earth rotated we could expect more impacts in Europe.

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To NASA's credit, this speculation was immediately countered in a February 15 early-morning press conference, in which Planetary Science Director Jim Green stated unequivocally that there was no connection. Unfortunately, the usual suspects are now accusing NASA of a cover-up. Blogs dedicated to bashing climate researchers and scientists who don't accept neocatastrophism now have another pseudoscientific conspiracy theory to promote.

We are left to ask just how unlikely is the coincidence of the two events happening on the same day? Is the improbability of that coincidence sufficient to overwhelm the strong observational evidence that they are unrelated? As is often the case in assessing the chances

of such coincidences, the estimate of probability depends to a great degree on how one frames the question. One can imagine three ways the question might be asked: (1) What is the chance that these two events would occur on a specific day, say Valentine's Day or some other specific "predicted" day, like the peak of a known meteor shower? (2) What is the chance that two such events would occur within a day of one another, on whatever day one or the other chanced to occur? (3) What is the chance that on the same day that one of these events occurred, say the Chelyabinsk bolide, another uncommon and newsworthy event also happened? Each of these probabilities can be estimated, and the numbers are radically different.

The flyby of an asteroid like 2012 DA14 has about the same probability as the Chelyabinsk impact to within our uncertainties, which are at least a factor of two. An impact somewhere on Earth of an object the size of the Chelyabinsk projectile, like the pass of an asteroid of the size and at the distance of 2012 DA14, happens about once every century on average, or about once in 40,000 days, to one significant digit. If you start by selecting a specific date, like February 15, 2013 (case 1 above), the chances of both events happening are extraordinarily small, one chance in 40,000 squared, or about one in a billion. But a more realistic question to ask is, as in case 2 above, given that one of the events, say the Chelyabinsk event, did happen, what is the chance of the other event, the 2012 DA14 flyby, occurring on the same day? The answer to that is, of course, just the chance of the other event on any given day, or 1 in 40,000.

Even this estimate is highly "framed" by the specifics of the particular events. Suppose we asked what are the odds of a fifty meter diameter asteroid passing within 30,000 km of the Earth the same day, or of a 20 meter diameter asteroid passing within 15,000 km? The answers would be "Who cares? They didn't." By sizing a "box" specifically to just include the events in question, we radically affect the apparent coincidence of the events.

As a final example, consider case 3 above. Given one of the events, again take Chelyabinsk, we can ask, "What is the chance of another newsworthy event of a kind that might plausibly be related, occurring on the same day?" An event "that might plausibly be related" could include another actual impact, or the close fly-by of the Earth by another small asteroid, or perhaps a major earthquake. Looking ten or fifteen years into the past or future, there have been a number of real or imagined events. There was a very large bolide over Indonesia in 2009, a large meteorite that notoriously failed to break up and actually hit the ground whole in Peru in 2007, and the asteroid 2008 TC3, that was discovered in space before it hit the Earth in October 2008. Although the 2012 DA14 close flyby is claimed to be roughly a once-per-century event, the much larger asteroid (99942) Apophis will make a similarly close flyby in only sixteen years, in 2029. Still other asteroids flew by that failed to make headlines because they were discovered only after their close flybys, but presumably would have raised a question of correlation if they had occurred on the same day as another event. In the same time frame, we have experienced two of the most destructive earthquakes in history (Indian Ocean in 2004 and Japan in 2011).

Thus some newsworthy event, such as an actual atmospheric entry, a close asteroid flyby, or a major earthquake, occurs every few years, say about once in a thousand days. So the answer to case 3 appears to be about one chance in a thousand that a second event, of a kind that could raise a question of correlation, might occur within a day of the event in question.

The probability of the coincidence of the two events can range from one in a billion to one in a thousand, depending on how we frame the question. It is noteworthy that no reasonable analysis suggests that such a coincidence is "expected"; even one in a thousand is a rare event. But on any given day, one can make an advance list of many thousands of possible events, each of which has a one-in-a-thousand chance of happening. With that many chances, it is virtually certain that some of them will occur. So raising the question of correlation is not frivolous, but the odds are not so rare as to seek extreme explanations rather than conclude that it was no more than a curious coincidence. ■

David Morrison is a planetary scientist and astrobiologist who after a long career at NASA is now director of the Carl Sagan Center for the Study of Life in the Universe at the SETI Institute. One of his areas of study is the risks of asteroids and other near-Earth objects. He has been active in helping the public sift fact from sensationalism about these and other planetary science topics. He is a Committee for Skeptical Inquiry Fellow and a contributing editor of the Skeptical Inquirer. Asteroid 2410 Morrison was named after him.

Alan Harris is a senior research scientist retired from JPL, still pursuing research on asteroids, especially near-Earth asteroids. He has advised NASA and other government agencies on the design of asteroid surveys and in assessing the progress in inventorying the population of potentially hazardous asteroids. He also has a longtime interest in skeptical investigations, previously publishing, along with Clark Chapman, "A Skeptical Look at 9/11" in the September/October 2002 Skeptical Inquirer and its follow-up, "9/11: Perspectives from a Decade Later" in the November/December 2011 SI. Asteroid 2929 Harris was named after him.

Mark Boslough is a physicist at Sandia National Laboratories, adjunct professor at the University of New Mexico, and a Committee for Skeptical Inquiry Fellow. His work on comet and asteroid impacts has been widely recognized and been the subject of many recent TV documentaries. He is a vocal critic of pseudoscience and antiscience, especially global warming denial. Asteroid 73520 Boslough was named after him. The opinions expressed here are his own.

Down the Garden Path: Faulty Thinking and Self-Delusion

A Navy neurologist's credulous venture into acupuncture advocacy serves as a useful case study. Here are twelve mistakes he made rambling down the garden path of self-delusion.

HARRIET HALL

Quacks sell snake oil, and some of them really believe their products work. Medieval doctors who used bloodletting to balance the humors were convinced that it worked. But would you expect an intelligent, highly educated twenty-first-century medical doctor to be fooled (or to delude himself) into believing that a placebo was actually a highly effective treatment? Doctors ought to know better. They're supposedly trained to figure out what really works. But they're only human; they're not exempt from the kind of cognitive errors we are all prone to. Curiously, people who make foolish mistakes are usually so sure of themselves that they're not at all shy about revealing their foolishness to the scrutiny of others. A Navy neurologist, Capt. Elwood Hopkins, has conveniently described for us, in great detail, the process by which his faulty thinking led him into error.

He posted a three-part article on "The Power of Acupuncture" (Hopkins 2011–2012) on *Navy Medicine Live*, the official blog of Navy and Marine Corps Health Care. It is a prime example of how even the most intelligent, educated person can ramble step by step down the garden path into self-delusion. Dr. Hopkins's story can serve as a useful lesson to all of us.

Background

Acupuncture has been increasingly accepted in military circles. The Air Force is teaching its doctors "battlefield acupuncture" (Gorski 2008) based on the faulty evidence of one Air Force doctor, Col. Richard Niemtzow. The Army is using it to treat PTSD. The Navy offers it too.

Hopkins says that after forty years of practicing neurology, "It was only natural to begin thinking about something else." (Why? Boredom? And why pick acupuncture?) When he got an email from his Specialty Leader announcing the opportunity for Navy doctors to learn how to do acupuncture, he submitted his application that same day. He was undoubtedly impressed that this training was being offered by the Navy, lending it the imprimatur of authority. His prior impression of acupuncture was that it was a "mysterious tool" that seemed to work, and instead of asking the critical questions, he said he was looking for "a fundamental scientific understanding of acupuncture" and asking to see the supporting research and data.

Mistake #1: Prior prejudice. It sounds like he already had a favorable opinion of acupuncture and was predisposed to accept it.

Mistake #2: Confirmation bias. He was looking only for confirmation rather than also looking for any disconfirming research. He wanted to understand *how* it worked; he was not asking *whether* it worked.

He says his intellect was actively engaged by the teacher, a "charismatic master acupuncturist," who laid a neurophysiologic foundation for how acupuncture works.

Mistake #3: Getting information from a biased source. A master acupuncturist is hardly likely to present a balanced picture of the evidence for and against the source of his livelihood. In calling the teacher "charismatic," he might have suspected that he could be influenced by that charisma to accept things he would not have accepted as readily from a dry, objective presentation of

scientific evidence about acupuncture's validity.

Hopkins was told about local physiologic changes in tissues stimulated by needles. He was not told that non-needle "acupuncture" (with electrical stimulation through intact skin or with simple touching with toothpicks) had been shown equally effective, even when acupuncture points were avoided. He was told that needles caused reversal of tissue acidosis. (This is a claim I don't remember hearing before, and I think it is based on a couple of Chinese studies on animals. Even if true, its clinical relevance would be questionable.) He was told about the "gate control" hypothesis but was not told that after half a century of investigation it has not been accepted as the explanation for acupuncture's effects. He was told about brain MRI findings and endorphin release but was not told that those same findings can be elicited by placebo pills. I see them as evidence of the mechanism for acupuncture's placebo effects; he interprets them as evidence that acupuncture "resets normal controls within the autonomic nervous system and maintains CNS homeostasis," though it's not clear what that even means; it sounds to me like typical alternative medicine pseudoscientific doublespeak.

Mistake #4: Cherry-picking the literature. The charismatic master acupuncturist snowed Hopkins with every shred of data that might possibly support a physiologic mechanism for acupuncture, even providing "an extensive reference library." Did he include the studies showing that it doesn't matter where you put the needles? Did he list the high-quality trials showing that sham acupuncture works just as well? Did he list all the negative systematic reviews or Edzard Ernst's recent systematic review of systematic reviews (Ernst et al. 2011) of acupuncture for pain? It is obvious that he cherry-picked the literature to support his claims. This is easy to do: plenty of low-quality studies of acupuncture have been published.

In Part Two of his article, Hopkins actually asks if the clinical effects might be due to placebo. He wonders how we would know, since there is "no honest way" to do a properly controlled double-blind study. His teacher says it is better to go by the functional outcome rather than by patient reports of pain levels. So far, so good. But then Hopkins throws science out the window and never mentions placebo again. He actually writes, "There is nothing like personal experience to convince one of an effect. It is a bit like not requiring a double blind placebo controlled cross-over study to establish that an open parachute is more effective than a closed one."

This sounds like it was written by someone ignorant of science and logic rather than by a neurologist. His analogy is a clichéd fallacy: We don't accept the effectiveness of parachutes because we have had personal experience jumping out of planes. I think he meant to say that not every claim requires proof by placebo-controlled trials, which is true but irrelevant here. We don't need to do controlled trials to find out if it is effective to stop hemorrhages or set broken bones, but we do require controlled trials to find out if acupuncture works. It's true that personal experience is the best way to *convince* someone there is an effect, but it's useless for determining whether there really *is* an effect. To correct his statement: There is nothing like solid scientific evidence to convince a scientist who knows better than to accept personal experience as evidence.

Mistake #5: Not understanding why science is necessary. It's hard to believe that was written by someone who has gone through medical school and residency training. It's a sad indictment of our educational system.

We don't need to do controlled trials to find out if it is effective to stop hemorrhages or set broken bones, but we do require controlled trials to find out if acupuncture works.

The instructor asks for volunteers and Hopkins offers himself as a guinea pig. The instructor treats him for his Raynaud's disease, telling him he believes it is due to prior cervical injury. As a neurologist, Hopkins should know that the term "Raynaud's *disease*" refers only to idiopathic cases and if the condition is secondary to some instigating factor, it is called "Raynaud's *syndrome*." Also, while repetitive trauma from vibrating tools like jackhammers and prior injuries to the hands or feet have been recognized as causes of Raynaud's, "cervical injury" has not. There are studies showing that acupuncture is more effective for Raynaud's than drugs or than no treatment, but they are not

convincing because they didn't use placebo control groups. After the treatment, Hopkins's symptoms resolved, and he became a believer.

Mistake #6: Relying on his personal experience. True believers ask us to "try it yourself" and they say, "I saw it with my own eyes." We have ample evidence that seeing something with our own eyes is often misleading, and that trying something for yourself can interfere with your ability to objectively assess the evidence.

Mistake #7: The *post hoc ergo propter hoc* fallacy. Hopkins assumes that because his symptoms improved *after* the treatment, they improved *because of* the treatment. He doesn't consider that there might be alternative explanations or confounding factors. (For example, emotional stress is a known trigger for Raynaud's symptoms.)

His classmates were treated for various conditions including nerve abnormalities and bladder inflammation, and they all "benefited." He calls acupuncture a "safe and inexpensive tool that has been time-tested for several thousand years."

Mistake #8: Relying on the personal experience of others. Testimonials abound for even the quackiest of quack treatments. No matter how many anecdotes we manage to accumulate, the plural of anecdote is not data; that's why we do science.

Mistake #9: The ancient wisdom fallacy. Hopkins is completely wrong about acupuncture being several thousand years old (Kavoussi 2010), and even if it were that old, length of use is no indication of truth. Astrology has been around for longer than acupuncture; does he think its validity has been proven because it has been "time-tested"? Bloodletting to balance imaginary bodily humors was "time-tested" for many centuries, but it turned out to do more harm than good.

Astrology has been around for longer than acupuncture; does he think its validity has been proven because it has been "time-tested"?

Hopkins devotes Part Three of his article to recounting how he has implemented acupuncture in his practice. He has given over one thousand acupuncture treatments for everything from headaches to prostatitis. (One wonders why a neurologist would be treating prostatitis.) He claims a 90 percent success rate with many spectacular responses, and even uses the word "miracle." He admits that some patients don't respond, saying it is "never clear why." (I think I can guess why!) He reports improvements in control of diabetes and hypertension, less need for medication, better sleep, etc. He concludes that "It is now evident to me that there truly is a great benefit to acupuncture." He says it is safe (although the Ernst study [2011] documented rare but serious adverse effects including death). He says there are no contraindications, but numerous lists of contraindications can be found on the Internet both on acupuncture websites and on mainstream medical websites. He says the only time he would *not* use it was if the patient didn't want it. He recommends that anyone caring for patients should consider adding this tool to his or her kit.

Mistake #10: Relying on uncontrolled observations. His patients improved, but how many of them would have improved without any treatment or with a credible placebo that offered some of the nonspecific treatment effects of acupuncture?

Mistake #11: Proselytizing on the basis of his own uncontrolled observations. Now that Hopkins has convinced himself, he wants to persuade others by simple assertions and by the same kind of unreliable "evidence" that convinced him in the first place.

Mistake #12: Not doing his own research. Hopkins might have checked PubMed and found a neat new study (White et al. 2012) confirming previous evidence that acupuncture is no more effective than placebo. It showed that patients were more likely to improve if they believed in acupuncture and believed they got the real thing rather than a placebo, regardless of which one they actually got. He might have read what Yale neurologist and CSI Fellow Steven Novella (2007) wrote after independently researching the literature on acupuncture for himself [see also Novella's column, "What Is Acupuncture?" Skeptical Inquirer, July/August 2011]. He might have read the many negative systematic reviews, such as the one (Madsen et al. 2009)

showing that a "small analgesic effect of acupuncture was found, which seems to lack clinical relevance and cannot be clearly distinguished from bias" or the systematic review of systematic reviews by Edzard Ernst and others (2011) showing "numerous contradictions and caveats." He might have read the many skeptical articles on science blogs. He might have read *The Skeptic's Dictionary* entry on acupuncture. He might have consulted Quackwatch's affiliate Acupuncture Watch. Even just reading the acupuncture article on Wikipedia might have raised some doubts in his mind.

At this point, even if he were willing to look at the great mass of disconfirming evidence, he would probably not be capable of judging it objectively. Once someone has become a true believer on the basis of personal experience there is rarely any hope, especially when belief is reinforced by social support and grateful patient feedback. Let's hope he doesn't go on to seek training from a charismatic homeopath or a reiki master.

I can understand why many doctors are less skeptical than they should be about most of the alternative medicine information they encounter: they are used to having predigested, accurate scientific information presented to them by experts. They were (sadly) not taught to question what their teachers said in medical school and residency. They were taught about evidence-based medicine, but they were not taught to take prior probability into account: they are willing to accept the results of controlled studies even when they are incompatible with the rest of scientific knowledge. They rely on published information in medical journals, but they may not realize that half of the studies they read are wrong (Ioannidis 2005). Even if they are good at critically evaluating scientific medical information, they may not be used to critically analyzing information from the realm of alternative medicine. They may not have learned to recognize the common logical fallacies and the pitfalls.

The One Big Mistake: Not Following the SkepDoc's Rule of Thumb. My rule, which applies to critical thinking in every sphere: before accepting any claim, *find out who disagrees with it and why.* Once you fully understand the arguments on both sides, only then are you qualified to judge whether the claim is credible (and it will usually be glaringly obvious which side makes more sense). What if a jury listened to the prosecution but not to the defense?

When examined as a whole, the available evidence fits the hypothesis that acupuncture is an elaborate placebo system. Using placebos on patients is unethical. As a retired Air Force colonel and as a physician, I am saddened to see acupuncture infiltrate the military health care system. And I am saddened to see how Dr. Hopkins's faulty thinking led him astray.

Our brains evolved for success in survival as hunter-gatherers on the plains of Africa, not for a modern world of science and computers. We prefer stories to statistics, personal anecdotes to scientific studies. System 1 thinking (fast, emotional, and intuitive) is the default mode; it comes more naturally to us and requires much less effort than System 2 thinking (slow, deliberative, and logical). Not everyone reads the Skeptical Inquirer. Not everyone can overcome the natural tendencies of our flawed brains. Not everyone wants to try. But those who do can learn from Dr. Hopkins's bad example. ■

Note

This is adapted from an article originally posted on the *Science-Based Medicine* blog under a different title (Hall 2012).

References

Ernst, Edzard, Mysong Soo Lee, and Tae-Young Choi. 2011. Acupuncture: Does it alleviate pain and are there serious risks? A review of reviews. *Pain* 152(4): 755–64.

Gorski, David. 2008. Battlefield acupuncture? (blog entry). *Science-Based Medicine* (December 15). Available at http://www.sciencebasedmedicine.org/index.php/acupuncture-invades-the-military/.

Hall, Harriet. 2012. Acupuncture, the Navy, and faulty thinking (blog entry). *Science-Based Medicine* (January 10). Available at http://www.sciencebasedmedicine.org/index.php/acupuncture-the-navy-and-faulty-thinking/.

Hopkins, Elwood. 2011–2012. The power of acupuncture (blog entry in three parts). *Navy Medicine Live* (December 22, December 29, and January 5). Available at http://navymedicine.navylive.dodlive.mil/archives/1550; http://navymedicine.navylive.dodlive.mil/archives/1577; http://navymedicine.navylive.dodlive.mil/archives/1604.

Ioannidis, J.P.A. 2005. Why most published research findings are false. *PLoS Medicine* 2(8):e124. Available at http://www.plosmedicine.org/article/info:doi/10.1371/journal.pmed.0020124.

Kavoussi, Ben. 2010. Acupuncture and history: The "ancient" therapy that's been around for several decades (blog entry). *Science-Based Medicine* (October 18). Available at http://www.sciencebasedmedicine.org/index.php/acupuncture-and-history-the-ancient-therapy-thats-been-around-for-several-decades/.

Madsen, M.V., P.C. Götzsche, and A. Hróbjartsson. 2009. Acupuncture treatment for pain: Systematic review of randomized clinical trials with acupuncture, placebo acupuncture, and no acupuncture groups. *British Medical Journal* 338:a3115. Available at http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2769056/.

Novella, Steven. 2007. Does acupuncture work or not? (blog entry) *Neurologica* (September 25). Available at http://theness.com/neurologicablog/index.php/does-acupuncture-work-or-not/.

White, P., F.L. Bishop, C. Scott, et al. 2012. Practice, practitioner, or placebo? A multifactorial, mixed-methods randomized controlled trial of acupuncture. *Pain* 153(2): 455–62.

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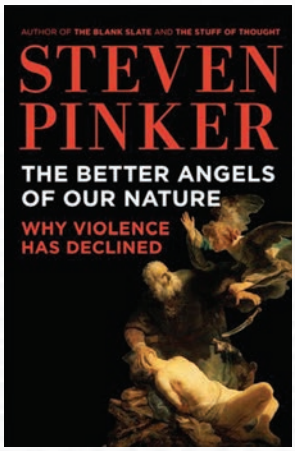
STEVEN PINKER ON VIOLENCE

An Interview by Indre Viskontas and Chris Mooney


AUTHOR OF THE BLANK SLATE AND THE STUFF OF THOUGHT
STEVEN PINKER
THE BETTER ANGELS OF OUR NATURE
WHY VIOLENCE HAS DECLINED

Acclaimed Harvard psychologist and best-selling author **Steven Pinker** was interviewed by Indre Viskontas and Chris Mooney in a rare live edition of *Point of Inquiry*, the flagship podcast of our Center for Inquiry. This special episode was recorded before a live audience as part of the 2013 annual meeting of the **American Association for the Advancement of Science (AAAS)**.

Pinker, a longtime Committee for Skeptical Inquiry Fellow, is the author of eight books, including *How the Mind Works*, *The Blank Slate*, *The Language Instinct*, and most recently *The Better Angels of Our Nature: Why Violence has Declined*. The interview focuses on the premise of his latest book: that we now live in the least violent and most peaceful period of human history, particularly surprising in light of tragic recent events in Newtown, Connecticut, and Boston. Here is the majority of that interview.

Indre Viskontas: What inspired you to write a book about violence?

It's a natural topic for anyone interested in human nature. The question, "Is our species innately violent and war-loving, or innately peaceful and cooperative?" goes back literally hundreds of years, maybe thousands. So it naturally falls under the category of psychology.

In my case, it began with my books *How the Mind Works* and *The Blank Slate* where I advocated the idea that there is such a thing as human nature—some parts of which can be rather nasty [See Pinker, "The Blank Slate: The Modern Denial of Human Nature, Skeptical Inquirer, March/April 2003]. We have urges like revenge and dominance that can erupt in violence. I had to anticipate an objection I knew would come: If we do have these tendencies, does that mean that we also have to have a fatalistic attitude toward war, peace, and violence? The worry is: if violence is in the genes—if we're killer apes and we have homicidal DNA—then there's nothing you can do about it.

But this is a non sequitur. The answer is no, we don't have to be fatalistic. For one thing, human nature is a complicated system. Even if we do have urges that can result in violence, we also have systems that can *inhibit* our urges toward violence. Whether we behave violently depends on which part of human nature prevails, and this balance can change with the circumstances.

In any case, there *can't* be a theoretical debate over whether we're doomed to a constant rate of violence, because when you open up the history books you find that rates of violence change. I gave a few examples of cases that I knew of at the time (this was in the 1990s), of how rates of violence had come down. For example, from the Middle Ages to the present, at least in England, there has been a thirty-five-fold decrease in the rate of homicide. Or if you look at the kind of life that our ancestors presumably lived—a foraging lifestyle, without a government and police force—the rates of death in tribal warfare were really, really high—higher than even in the twentieth century with our world wars.

I made these observations, and I noted that there can be no *a priori* debate about whether rates of violence can change. History tells us that they can change. A few years later, John Brockman, my literary agent and the proprietor of Edge.org, asked 150 scientists, philosophers, and writers for a couple of paragraphs on the question, "What are you optimistic about?" I tweaked those relevant sections of previous work and posted them online.

photo credit: Henry Leutwyler

Then I got a slew of correspondence from experts on violence who said, "You really understated the case. There are many other cases where there have been dramatic declines in violence." These were from scattered scholarly communities that had nothing to do with each other. For example, scholars in international relations who study war and peace said things like, "Gee, you know, it used to be that countries in Europe would start two new wars a year for 500 years. As of 1945, that went to zero." Military historians have just been astonished at the fact that war between developed countries has pretty much ceased to exist.

Other scholars said, "It's not just England where the homicide rate plunged since the Middle Ages. It's also Italy, Germany, Switzerland, and Scandinavia." Others said, "It's not just war between rich countries that has declined. If you look at statistics on war worldwide, since 1990, they have been going down, down, down; fewer people are killed in war than ever before."

Finally, one of my colleagues in the psychology department said, "Well, you could have added that rates of child abuse, approval of spanking, domestic violence—all of them are down." I realized that no one knew about all of these facts and they're pretty important.

The arithmetic trend of violence, positive or negative, is a basic fact. Everyone thinks it's gone up. But in fact, it's gone down. It also posed two delicious challenges to a psychologist. One is to understand why has there been so much violence in the past; the other is to understand *why* it has come down. These are the two psychological questions that got me going.

"The arithmetic trend of violence, positive or negative, is a basic fact. Everyone thinks it's gone up. But in fact, it's gone down."

CHRIS MOONEY: You paint the past as a world characterized by brutal violence. What is the causal reason for some kind of change?

There are a number of reasons, in part, because there are a number of causes of violence. Neurobiologists and neuroethologists have long known that there's no single thing called "aggression"; there are multiple systems in the brain that make organisms, including *Homo sapiens*, aggressive. So you'd expect there to be multiple causes that would drive them down.

I think the first and foremost is government—Hobbes's Theory of the Leviathan. A state with a monopoly on violence can penalize incentives for aggression and exploitation by imposing penalties that cancel out the anticipated gain. If you are likely to be thrown in jail after robbing a liquor store, then you think twice about doing it. That circumstance makes everyone more peaceful, because not only are you disincentivized from committing aggressive acts, but you know that your enemies are too.

It has a reverberating effect: you no longer have to maintain a belligerent macho stance to deter your enemies, because the government is doing it for you. You no longer have to pursue vengeance after the fact at all costs, because again, you can outsource that to the government. So, explanation number one would be the Leviathan. We see that the remaining zones of violence in the world are also zones of anarchy.

MOONEY: But that's assuming everyone's being rational: that they are calculating costs and benefits to some extent. But isn't violence largely emotional?

Yes, that's right, although the rational incentives and the emotional reactions can play off each other. If you live in a society where there is a rule of law for long enough, it changes your emotions. You become less likely to react with rage if someone gives you the finger or calls you a nasty name. You don't challenge them to a knife fight; you walk away. In the book, I talk about the interplay between these rational calculations and what you do and don't do intuitively.

VISKONTAS: One thing I love about your book is how you couch a lot of these issues within the prisoner's dilemma framework. Describe how we might apply it to issues such as gun control. There is a vocal set of people saying, "I need a gun because everybody else has a gun; so don't take away my right to have a gun." But this then leads to more guns and potentially more violence.

In the book, I allude to a version of the prisoner's dilemma—I call it the "pacifist's dilemma." It has the same structure but with different labels in the cells. I use it as a way of answering the somewhat mysterious question of why multiple historical forces all seem to be pushing rates of violence down.

Chris asked, "What are some of the causes?" and I explained one of them. Among the others are trade and commerce, which, in terms of game theory, has people playing more positive-sum games and few zero- or negative-sum games. If you have networks

of trade and exchange, it becomes cheaper to buy stuff than to steal it; and other people become more valuable to you alive than dead. If you have a rise of commerce and trade, the incentives change and people get less violent.

A third cause is the expanding circle of sympathy. As we consume more fiction, history, and journalism, and engage in more person-to-person contact, it becomes a little harder to dehumanize other people. They expand your sense of empathy and decrease your taste for cruelty.

I think the empowerment of women has been a factor. Societies and eras in which women have more rights, and more of a voice, tend to have less macho violence. And reason and science have played a role; as people intellectualize the human condition, they look at violence as a problem to be solved rather than as a game to be won.

I list these different reasons that violence has gone down. It's not a reductionistic, simplistic theory. But why have different forces all pushed in the same direction? Is there some kind of mysterious arc that bends toward justice?

The answer is no. There's a more mundane explanation—and now we get to the pacifist's dilemma—which is that violence is, in an objective sense, a really bad thing. It's a nuisance; it's a plague; it's a pestilence. Because even though it's always tempting to an aggressor to exploit a victim, it's far more damaging to the victim than it is beneficial to the aggressor.

Now over the long run, since aggressors can become victims and vice-versa—empires rise and fall—objectively everyone would be better off if everyone could forswear violence. It really is a better way to live than to blow things up and destroy flesh, and life, and suffer all the other nasty consequences of war. The dilemma is: How do you get the *other* guy to renounce violence at the same time as *you* do? This is where the game-theoretic calculation comes in. If I beat my swords into plowshares, and the other guy keeps his as swords, I could find myself at the wrong end of a rather unpleasant confrontation. So how do we both be sure to beat our swords into plowshares at the same time?

That is the human dilemma. It's like disease or hunger. It's a part of the human condition that sucks. Fortunately, we are smart, we can gradually, in bits and pieces, try to improve our condition. One of the ways that we do it is to try to incentivize everyone to forswear violence at the same time. The common denominator between these pacifying forces, I suggest, is that they all jigger with the payoffs in the matrix and turn the pacifist's dilemma into more of a rational actor circumstance in which we all opt for the mutual nonviolence cell.

MOONEY: Why does the U.S. seem to be such a violent place compared to other countries?

By a number of criteria, the United States is more violent than other Western democracies. Our rate of homicide is two to five times higher than that of other Western democracies. We start more wars, and thirty-three of the fifty states have capital punishment, which has been abolished everywhere else. The answer, I think, goes back to settlement patterns in American history.

The United States isn't a country; it's at least two countries. The rates of violence in the northern and coastal states are still higher than those of Europe, but not as high as those in the West and South. It's also the blue states that have abolished capital punishment and which tend to be more dovish in foreign policy.

So in part, this is a question about the American South and West. The simplest answer is that they lived in a condition of anarchy until fairly recently, historically speaking. The cliché, "The closing of the American frontier," refers to an event that took place as recently as in the 1890s.

Often in anarchic societies, you see a culture of honor developing. You have to avenge any insult, regardless of the cost to you, and adopt a belligerent stance, because it's your only protection. This stance got embedded into southern and western American culture, whereas the Europeans were beaten into submission by their autocratic kings many centuries ago.

VISKONTAS: How do we get the South or the areas in which there are the most guns to melt their assault rifles and turn them into iPads?

I don't have an easy answer to that question, because as you point out, the guns are out there. The gun lobby, having created the situation now says, "Well, there's nothing we can do about it and so let's make it even worse by having even more people get guns to defend themselves against all those people with guns."

VISKONTAS: I'm no expert on the statistics behind gun use and gun violence in the U.S., but I've noted that there are different ways of looking at these statistics. For example, if you look at the number of gun owners in the U.S. versus, say, Canada, the numbers are pretty equivalent. But the number of guns per owner, well, there's a huge difference.

That's an important point that's absolutely correct. Moreover, consistent with your statistic is that the number of households with guns in the United States has gone *down*, even though the number of guns has gone up. There are a smaller and smaller number of people who own bigger and bigger arsenals.

VISKONTAS: This makes me nervous because, of course, our weapons are getting more sophisticated. So even if the overall number of violent people in the population declines, it takes fewer and fewer to inflict more and more damage as we saw in some of these recent mass shootings. How do we fight that growth and these outliers of people who are particularly violent?

I think guns themselves probably aren't the main

place to look for an answer; although of course there are many common-sense gun control measures that any sane person would agree should be implemented. But the U.S.-Europe difference is not just a difference in the availability of guns. If you subtract out all the gun homicides in the United States and you just look at the homicides committed with, say ropes, candlesticks, and daggers, we *still* kill people at a higher rate.

I don't want to endorse anything that the NRA says, but there is some truth to the idea that it really is people who kill people rather than guns that kill people. That's why I think the psychology and sociology of violence is more important than just the weaponry.

In talking about rampage shooters, there's not much you can do; but to be honest, as far as violence goes, it's not that much of a problem in the seemingly callous sense of raw numbers. The Sandy Hook shooter killed, what, twenty-six people altogether? But *every day* in the United States, more than forty people get killed. After all that round-the-clock coverage of Sandy Hook, the cable news networks didn't say, "Oh, and by the way, we've had another Sandy Hook and-a-half today," and then on Thursday, "We've had another Sandy Hook and-a-half today again," and every single day since then.

Two categories of violence are peculiar in that they generate a massive amount of publicity, discussion, and concern while inflicting relatively little damage. One is rampage shootings, and the other is terrorism. The worst terrorist attack in history, the September 11, 2001, attacks, killed 3,000 people; and in the United States every year, 16,000 people are killed in homicides.

It's not a coincidence. Why do people blow themselves up? Why do people shoot up a school and then shoot themselves? Well, it's the only guaranteed way to get the world's attention.

As Adam Lankford, who just wrote a book on suicide terrorism, points out, let's say you wanted to become famous nationwide, even worldwide, what could you do to guarantee it? Make a great scientific discovery? Forget that. Compete on *American Idol*? Uh-uh. There is only one guaranteed way to become famous, and that is to kill a lot of innocent people.

We've set up that incentive structure. It's hard to know how to reverse it.

VISKONTAS: Is that an argument for the media not covering these mass shootings or these sorts of large events? Or people not paying for the coverage?

I think it is an argument for making news coverage and policy discussion more in line with those statistics—both the round-the-clock coverage of rampage shootings, and the response to terrorism. Our society was turned upside-down, and we started two foreign wars as a response to terrorism.

MOONEY: Why do more rights for women mean less aggression in society?

There are several motives for violence, and in some there's not much of a sex difference. If you're the head of state, you're defending your country's interests among other hostile states. Any woman running a country is going to act in the interests of that country, including waging war when that's the rational thing to do. That's the category of "violence as a means to an end"; I don't expect a sex difference.

But when it comes to stupid, macho violence—knife fights over a parking space, road rage, fights over a pool table, wars over national honor where nothing is at stake *except* national honor, campaigns of bloodthirsty conquests, and insane wars of aggression—that's more of a guy thing.

In non-state societies, anthropologists have documented a correlation between competition between societies and the state of women's rights. Societies that are more egalitarian tend to be less warlike. It's hard to know what's cause and effect, but there is a correlation.

The societies that control women, control their reproduction by selling them off as brides, by protecting their chastity, by forcing them to become round-the-clock baby factories tend to have more violence.

Also, in societies where women have more autonomy, the first place they exercise that autonomy is their own sexuality, their own reproduction. In places with women's rights, women have fewer babies, they have them later, and as a result, those places are less likely to have youth bulges, which are a risk factor for violence.

Another thing that goes along with women's empowerment is that societies

"In general, when you have anarchy, you have high rates of violence, so if you precipitously remove government, you end up with violent chaos."

are less likely to murder female newborns or abort female fetuses. If you've got lots of babies coming out, and lots of them are boys—well, that leads to trouble down the line. You get youth bulges of unemployed, unattached young men; and that means trouble. Societies where women control their reproduction are societies that have fewer of these youth bulges.

VISKONTAS: Are there exceptions to the decline in violence, for example, in countries in Africa? And do those cases help explain the decrease?

There are exceptions. It's not a monotonic [stable, neither increasing nor decreasing] nor uniform worldwide phenomenon. One example is the huge increase in violent crime in the United States and most other Western countries starting in the 1960s. Another is the heyday of genocidal totalitarian regimes in the middle decades of the twentieth century—the glory days of Hitler, Stalin, and Mao. A third is the rise in civil wars following decolonization in much of the developing world. And even though rates of war in Africa have gone way down over the last couple of decades, many sub-Saharan African countries still have high rates of homicide.

This is not some mysterious force that just brought violence down monotonically everywhere. But at least some of these exceptions are exceptions that prove the rules. In general, when you have anarchy, you have high rates of violence, so if you precipitously remove government, you end up with violent chaos. In Iraq, just toppling Saddam Hussein's regime and not putting an effective government in its place opened the ground for a lot of internal violence. Likewise, when the often oppressive, but at least minimally competent colonial governments gave way to utterly incompetent kleptocracies and tribal favoritist regimes, you ended up with a lot of violence in countries in the developing world.

MOONEY: What do you think about Jared Diamond's characterization of tribal societies as in a state of perpetual warfare?

Perpetual warfare is a bit of an exaggeration, but the observation that the rates of death and warfare are very high is correct. I have a chapter in the book where I go over every quantitative estimate I could find from the ethnographic literature, and also from the archaeological literature, on rates of violence in non-state societies. They span a range; not all of the societies are at war all the time; some are more violent than others. But if you look at the average, it's very high. So Diamond is right. And Napoleon Chagnon, another person who's been attacked for making such claims, also has the numbers on his side.

VISKONTAS: Some of the social media we engage in so much now—say, Twitter—put a personality onto people from around the world. I connect with people on Facebook who are in Africa whom I would never have a personal relationship with, but on Facebook, I see pictures of their kids and pictures of their life. And on Twitter, I hear their witty, pithy remarks. Do you think that some of these social media technologies might be pacifying in the end?

I suspect over the long-term they might be, because similar things have happened in the past. One of the puzzles I take up in the book is why in the second half of the eighteenth century, the world made a quantum leap in humanity. That was the era in which countries stopped disemboweling people for criticizing the king and stopped having public executions. The first movements to abolish slavery got traction, debtors' prisons were abolished, and they stopped burning heretics at the stake. Blood sports like dog fighting were abolished. You had the first articulate statements of women's rights, of children's rights, of gay rights, all in the eighteenth century. Our own prohibition of cruel and unusual punishment in the eighth amendment to the Constitution occurred smack-dab in the middle of this process.

So what happened in the second half of the eighteenth century? Why did the world wake up and suddenly realize, "Hey, you know, there might be something a wee bit wrong with slavery after all, even though we've been doing it for thousands of years"?

The most plausible candidate is that the second half of the eighteenth century saw the rise of affordable printed media and the rise of literacy. If you look at what happened before that era—you can't do experiments, so you do the next best thing and you at least try to identify some exogenous, putative cause that occurs prior in time to the punitive effect—the only one that I was able to find is a massive increase in technologies of cosmopolitanism.

You had national and international post offices—the email and Twitter of the time. You had a huge increase in the economic efficiency of publishing books and pamphlets; you had an expansion of the press. It was cheaper to travel from city to city. These cosmopolitan forces back then, I think, led to increasing humanitarian sensibilities.

There was a second wave of that in the 1950s with the rise of television and electronic media. The Vietnam War was the first war to be brought into people's living rooms in real time; and it was the first war that had a substantial antiwar movement as it was progressing—which I suspect was not a coincidence. ■

The *Queen Mary* Is Not Haunted

(But I Understand Why You Think She Is)

The RMS *Queen Mary*, a ship of enormous historical import, has been transformed into a roadside attraction whose owners profit off the allure of "ghosts." Her glorious factual history has been brushed aside in a bid to pander to eager ghost-hunting tourists who aren't thinking critically about the claims.

JOHN CHAMPION

> "For me, it is far better to grasp the universe as it really is than to persist in delusion, however satisfying and reassuring."
>
> —Carl Sagan, *The Demon Haunted World*

I've had a fascination with classic ocean liners for most of my life. In particular, I have had a sincere awe for the RMS *Queen Mary* (QM) since I first stayed on board in the early 1980s—well after her retirement in 1967 and subsequent conversion into a hotel. She is a thing of beauty—a near-perfect expression of the industrial design aesthetics of the era (conceived in 1929, launched in 1934, maiden voyage in 1936). To say that we don't make them like we used to is an insulting understatement.

Anytime in the last few years that I have even mentioned the *Queen Mary*, the immediate reaction from people within earshot is, "Ooh! I've heard that she's *really* haunted!" My first reaction is a kind of amusement: how could one even tell the difference between something being *really* haunted as opposed to *fakely* haunted? My next reaction is usually a sigh of, "Here we go again," and my final reaction more recently has been a kind of offense taken on behalf of the ship. I suppose that since an entire generation has passed since the *Queen Mary* was in service, the popular understanding of her has morphed into something a little weird and otherworldly rather than something that was a practical means of (elegant) travel. I write this article to express my own dismay but also to try to piece together why the QM has this persistent aura as the "haunted ship" and to make a plea to emphasize the real history of the ship as part of her future.

What Is a Haunting?

I suppose the first thing to do is to make a concise case for the problem of claiming that anything is "haunted." No, I do not believe in ghosts, and at the same time a truly skeptical position must concede that this is not an outright rejection of the possibility that ghosts might exist, only that they haven't been discovered yet. The problem is that there is no agreement among ghost believers as to what they actually are. If I had to aggregate just from popular ghost-hunting stories, I could paint a picture that ghosts are: sound-producing, light-producing, simultaneously corporeal and noncorporeal representations of "energy" (Electric? Chemical? Nuclear? Magnetic?) that can manipulate electronic devices, temperature, and physical bodies—except for when they don't. There are so many definitions and assumed qualities of ghosts that it is impossible to come up with a working definition. In science, I would call that a "hypothesis." Once there is a hypothesis or a working model explaining the properties of ghosts, then one could go about controlled experimentation. No one is at that stage though—because, again, ghosts have no known properties. So, no, the things that are claimed as "evidence" of ghosts (orbs in photos, mysterious sounds on a tape, a creaky door) can't hold up as scientific evidence until a working hypothesis is established.

Furthermore, of course, anecdotes are not evidence. An anecdote is a personal story of a personal experience. It's not a reliable way to make a judgment about the validity of a claim. Our minds are subject to bias, misunderstanding, misinterpretation, and conflation. The more anecdotes that accumulate don't lead to the credence that the claim is true; it's simply more "noise." Personal experience is usually the absolute worst way to make a judgment about the veracity of any claim.

So that's a little taste of why I don't buy it when people make the "ghost" claim, but there are far better sources to brush up on your scientific understanding, such as Carl Sagan's *The Demon-Haunted World*, Michael Shermer's *Why People Believe Weird Things*, and *50 Popular Beliefs That People Think Are True* by Guy P. Harrison. While you're at it, check out Brian Dunning's excellent (and short!) dismantling of ghost claims in "Do Ghosts Exist?" on his blog at www.skepticblog.org/2012/08/30/do-ghosts-exist. There's much more that can be said here, but I want to get back to the *Queen Mary*.

History

The *Queen Mary* was one of the crowning achievements of the art and industry of shipbuilding. She was created and sailed in an era after the Edwardian opulence of ships like the *Titanic* and *Lusitania* and just before the jet age had arrived. She's a blend of old hand-craftsmanship with the speed and technology of modern industrial achievement. To put it in twenty-first-century terms, she was a marvel of art and design in the way that the space shuttle amazed onlookers thirty years ago or the 787 Dreamliner and Airbus 380 do today. She held the speed record for crossing the Atlantic for nearly two decades and carried more troops at a single time than any other vessel during World War II.

After an exceptional service history (and with the speed and economy of air travel relegating ocean travel to vacation cruising), the QM was set for retirement in Long Beach as a hotel/conference center/tourist attraction. Since 1967, tourists have visited her in dry dock and gotten a small taste of what travel was like when the "Queens" ruled the seas.

Retirement, sadly, would be anything but peaceful. As soon as she pulled into port for the last time, the *Queen Mary* was subjected to numerous "renovations" and conversions that would forever mar her interior. Entire sections have been gutted, rooms and artifacts lost to history, artwork destroyed, and other blunders of huge proportion. The ship's operations and ownership have changed hands numerous times in the years since, and she has struggled economically. In many respects, the experience has been "dumbed down" with subpar restaurants (with some notable exceptions), chintzy events, and history taking a backseat to exploitative tours—the most prominent and most egregious of which is the "ghost" tour.

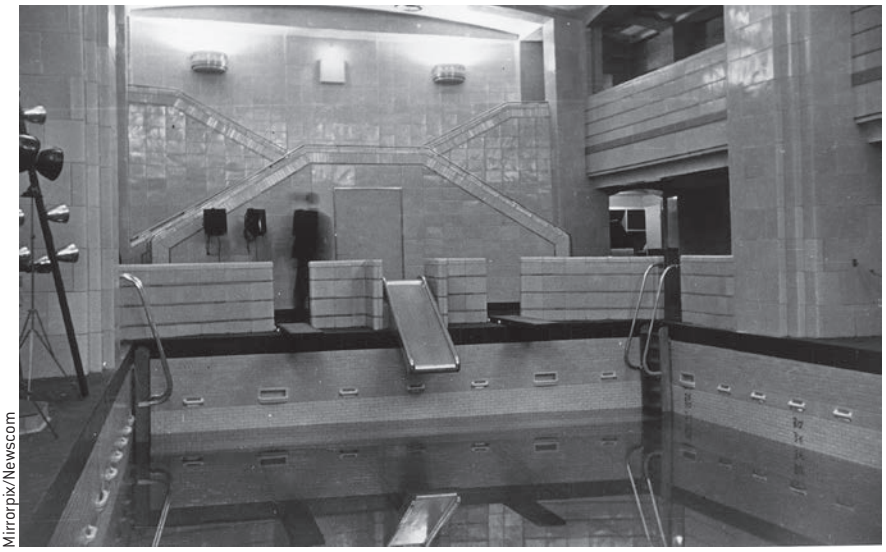
In the early 2000s, the "Ghosts and Legends Tour" was installed. It makes use of some very interesting (and otherwise off limits) spaces of the ship. Fantastical tales of the paranormal are woven into the ship's actual history and presented with a theatrical flair and some low-rent special effects. Tourists see the magnificent first-class pool area but not in any state resembling its days at sea. This version is fading, cracking and filled with fog. The real-life accident with the *Curacao*—in which 239 sailors perished—is played out for maudlin drama in a former mail hold that plays the part of the "bow."

The Problem with the "Haunting"

On any night at the *Queen Mary*, groups of tourists who are interested can also take a guided tour from a "paranormal" expert guide. They bump around waving electronics of dubious utility in the air hoping for some "evidence" of an apparition. They can explore otherwise off limits sections of the ship and really take their time exploring while asking each other, "Did you hear something?"

If you're more interested in learning the true history of the ship, your options are a bit more limited. There is a "behind the scenes tour" (which seems to be confused at various times with the "Golden Age" tour and others) as well as a self-guided audio tour, which is in desperate need of renovation itself. Depending on the guide you have for the "behind the scenes" tour, you may have a dramatic interpretation of events on board or a rote telling of facts and figures. Much of this can be gleaned by a read of any *Queen Mary* books or the Wikipedia page about her.

So let's think about this. The *Queen Mary* is actively promoted as a "haunted" attraction (and I'm sure they are making a decent amount of money from that), but a serious, concerted effort to preserve her factual history is somehow pushed to the wayside. At best, it's an annoyance to those of us who want to understand and appreciate this vessel from her service and the stories of the people on board. At worst (and this is what is happening more often than not) the "haunting" is such a priority that it leads to actual damage of those historic areas, preventing further and future preservation. One historian points out that on this massive vessel only about six public rooms remain intact (though without much of their original art or



Mirrorpix/Newscom

Queen Mary ship swimming pool in the 1930s, "ground zero" for supposed paranormal activity.

furnishings). Others were ripped out entirely, reconfigured or converted for other vaguely defined uses.

The First Class Pool is "ground zero" for the alleged paranormal activity so many ghost enthusiasts are seeking. (The Second Class Pool has been utterly destroyed in one of the many "conversion" episodes.) At the time, the pool was a stunning room at sea with gleaming tiles and art deco style. Today, the ghost tour trades on the pool's decrepitude, profiting off of the "creepy" allure of cracked tiles, warped floors, and broken fixtures. What is the incentive to restore this magnificent space to its original condition when a quick buck can be made off of ghost tours? When the pool finally falls through (the lower supports have been removed), maybe that will just add to the narrative for the cynical exploitation of the space.

But I Get It...

I can't get enough of the *Queen Mary*. I'll stay on board at every opportunity and sign up for any tour, event, or promotion they have. Unlike so many other historic relics, the *Queen Mary* feels very much alive, not like a stuffy museum piece that can only be experienced at a distance. It is immersive, impressive, and totally consuming. This, to me, is why we can't get enough of those ghost stories and why people are utterly convinced that their own experiences (anecdotes based on misinterpretation, strongly held predisposition, and the excitement of fantasy) are proof positive of the supernatural.

The *Queen Mary* was built to be in motion. She feels like she is in motion even when she is standing perfectly still in dry dock. The extreme shear of the decks (the curve that is apparent in the longest stretches of corridor) plays with your normal perception of space. We're not accustomed these days to being inside structures with such tight compartments, such detail in wood and metal constructed with an artistic eye but, underneath, all machine. Its power—even with the engines now long dormant—is palpable through the deck plating. Every rivet, every section of carpet, every porthole was witness to the widest variety of intensely human experience. From the builders who put her together to the crew who stayed with her in extreme circumstances to the celebrating passengers, every square centimeter has been a part of a pageant of history. One can't help but stand in a room onboard and immediately conjure up the images of the hundreds of thousands who occupied the same space years, decades before. She makes great noises, even sitting still, as the metal skin holding her together expands and contracts and pieces jostle around after seventy-five-plus years of settling. We don't get that in our daily experience in the interactions we have with architecture. We don't stop to think about who came before us when walking into a conventional building lit up by fluorescent glare.

I really get it. When I'm on board, my imagination is firing at full steam. If I'm quiet, I can't help but hear what the ship must have been like when operating on the Atlantic. If I look closely enough, I can see the throngs of people who populated her decks during decades of heroic crossings.

I draw a line, though. It's a priority for me to draw a sharp distinction between fact and fantasy. I want to honor the people who built and sailed on this magnificent vessel by remembering who they really were and what they really did. There are plenty of stories there to entertain and educate. I don't want to taint that memory by confusing their actual lives with a creepy "ghost" story traded for the value of a ticket to a roadside tourist attraction.

I'm disappointed to think that the *Queen Mary* presents an either/or proposition. Through mismanagement and the chase after a quick buck, the fantasy-prone among us have won out with the tourist attraction to the demise of historic preservation. Ghost stories are fine when they are presented as such. The confusion of science and history with fiction, though, gets us further and further away from the ability to relish in and truly explore our own recent history. ■

John Champion is a video producer in Los Angeles and supporter of CFI–Los Angeles and IIG West. He is the cohost/producer of *Mission Log: A Roddenberry Star Trek Podcast*, which explores the morals, ethics, and philosophies presented in *Star Trek*.

Investigating Plagiarism in New Age Books

Shoddy research is almost expected in New Age books, but an investigation of a supposed reference work on vampires found and documented something even worse—rampant plagiarism.

BENJAMIN RADFORD

In early 2011 I published a book titled *Tracking the Chupacabra: The Vampire Beast in Fact, Fiction, and Folklore*. A few weeks after it was released, I happened to be in a local store looking for books to add to my skeptical library.

One particular tome caught my eye: *The Element Encyclopedia of Vampires: An A–Z of the Undead*. As an aficionado (and investigator) of monsters, vampires, zombies, and the like, I'm always interested in seeing new books, especially if they offer some new information on the topic. The book was about 650 pages long and would surely contain something new, so I picked it up.

When I see a new book on the paranormal or unexplained I often flip through to find a discussion or two of topics with which I am familiar, so that I can get an idea of how well-researched the book is. If it's fairly accurate I'll buy it, but if I see many obvious factual and logical errors I know the book is garbage.

So I naturally first turned to a topic I am intimately familiar with, a subject that I am, for better or worse, the world's top expert on: the vampire beast *el chupacabra*. I found a significant entry on it spanning four pages. Some of the information was right, much of it was wrong or misleading, but there was one thing that jumped out at me—this sentence on page 137: "In 2005, Isaac Espinoza spent millions of his own money trying to hunt down the chupacabra. He lived in the jungles of South America for eight months with a team of researchers, video and print journalists, and local guides."

I was puzzled by this. In my five years of thorough research into the chupacabra I'd never heard of this Isaac Espinoza researcher. If he spent millions of dollars and eight months in the jungles of South America, he definitely seemed like someone who I'd have heard of (and probably should have interviewed!). The author, Theresa Cheung, surely hadn't just made him up in a reference work published by HarperCollins. I began to question my own research and scholarship: How could I have missed Espinoza's research?

I knew I hadn't come across Espinoza in the dozens of books and articles and interviews I'd done; perhaps an Internet search would solve the mystery. I did a Google search for "Isaac Espinoza" and "chupacabra" and found about 200 hits. The top hit was from a website called UnknownExplorers.com. There was no other information on Espinoza; the same set of sentences appeared on each site, with no variation, which struck me as odd. Surely Espinoza would at least have his own website, or have appeared in media articles by one of the many researchers and journalists who accompanied him.

Not only that, but there was another clue that something wasn't right: The poor grammar was identical. "Isaac Espinoza spent millions of his own money" doesn't make sense; Espinoza may have spent millions *of dollars* of his own money, but "money" is an unquantified noun; one cannot spend millions of "moneys." Had both the original author (whoever it was) and Cheung written an identically incorrect sentence? Or was there more involved? My skeptical sense was tingling.[1]

It seemed clear that Cheung had simply cut and pasted the information about Espinoza from the web into the chupacabra entry in the encyclopedia she was writing. If she was so indifferent to factual accuracy in her book that she would use someone else's words without bothering to check to see if the information was true (much less "credit" them), then what did that say about her other research?

I photocopied the chupacabra entry and skimmed it with different colored highlighting pens. Using my own chupacabra notes, books from my library, and the Internet, after several hours I identified no less than four different sources from which Cheung had taken her words, often verbatim.

I was shocked that the plagiarism was so obvious and so rampant. Furthermore, I realized that it was very unlikely that the one subject entry in the encyclopedia that I happened to fact-check was the only one that had such a problem. I contacted a colleague, Josh Hunt, to assist with my investigation, and together we worked on and off for several weeks spot-checking other random entries in the encyclopedia.

Plagiarism is a serious accusation, and I did not want to publicly accuse Cheung unless my case was airtight. Any author can make a few forgivable, careless mistakes in forgetting (or failing) to adequately reference other writer's works; it happens. However, as the weeks passed it became clear that the plagiarism in *The Element Encyclopedia of Vampires* was both unmistakable and rampant. This was not an isolated incident.

Finally after hours of meticulous research I contacted a HarperCollins representative in the United Kingdom, where the book was published. My email is printed below.

> Dear Siobhan Kenny,
>
> Our research has found numerous instances of material apparently plagiarized by HarperCollins author Theresa Cheung in her book *The Element Encyclopedia of Vampires*.
>
> Plagiarism, as you know, is the appropriation of another person's ideas, results, or words without giving appropriate credit. It is not limited to verbatim copying of another's work, but includes paraphrasing. Any words written by another author must be correctly cited and quoted. Material that is taken directly and verbatim from another author's work must appear either in quotation marks or block quotes, and be clearly identified either in text or in citations as that author's words. Specific citation and reference styles of course vary from house to house (and sometimes project to project), but all of them are designed explicitly to avoid plagiarism. I am not only the author of five books and columnist (Discovery News and LiveScience.com) but also have been a magazine editor for 12 years, and I am familiar with the standards and practices of both book and magazine publishing.
>
> As I'm sure you are aware, plagiarism is a serious issue. In fact just last month Germany's defense minister, Karl-Theodore zu Guttenberg, was forced to resign from his post because he was found to have plagiarized parts of his doctoral dissertation. Exposed cases of plagiarism have damaged author's careers and raised questions about the credibility and professionalism of their editors and publishers.
>
> The first example I uncovered is in Cheung's entry on Chupacabra (page 136). From my research, over 80% of her entry was taken, uncredited, from other sources—principally the Web sites www.weirdsciences.net, www.unknownexplorers.com, and www.weird-encyclopedia.com, as well as Bob Curran's book *Vampires: A Field Guide to the Creatures That Stalk the Night* (2005, New Page Books). One of the sites, www.unknownexplorers.com, is no longer online, but I have attached an archived screen shot of the relevant Web page, and it can also be found by searching www.waybackmachine.com.
>
> For example:
>
> 1) The last third of the first paragraph, beginning with "Some autopsy reports" and ending with "drained of blood" (p. 137) was taken verbatim from http://www.weird-encyclopedia.com/chupacabras.php: "Some autopsy reports show damage to internal organs such as the liver, without any local exterior damage. Mutilations are performed with surgical precision. One report speaks of a cow, completely skinned from head to hoof, and drained of blood."
> 2) The next paragraph is merely a collection of generic descriptions that could have come from anywhere, but the third paragraph (under "Reported Attacks," p. 137) was paraphrased (with some verbatim passages) from http://weirdsciences.net/weird-sciences-home-page/aliens-ufo-and-extraterrestrials/chupacbras/: "The legend of *cipi chupacabra* began in about 1992, when Puerto Rican newspapers El Vocero and El Nuevo Dia began reporting the killings of many different types of animals, such as birds, horses, and as its name implies, goats. However, it is predated by El Vampiro de Moca (The Vampire of Moca), a creature blamed for similar killings that occurred in the small town of Moca in the 1970s."
> 3) The second half of the paragraph under "Reported Attacks," beginning with "For a time the carnage" and ending with "Baja, California" was copied verbatim and in its entirety from page 49 of Bob Curran's book *Vampires: A Field Guide to the Creatures That Stalk the Night* (2005, New Page Books); see attached scan.
> 4) The following four paragraphs, beginning with "In July 2004" (p. 137) and ending with "wolf in the area" (p. 138) were copied verbatim from http://weirdsciences.net/weird-sciences-home-page/aliens-ufo-and-extraterrestrials/chupacabras/.
> 5) The following paragraph, beginning with "On January 11, 2008" and ending with "long back legs" was taken nearly verbatim from Wikipedia: http://en.wikipedia.org/wiki/Chupacabra.
> 6) The next paragraph, beginning with "Among the hill people" and ending with "it needs blood to survive" was copied nearly verbatim from page 50 of Bob Curran's book *Vampires: A Field Guide to the Creatures That Stalk the Night* (2005, New Page Books); see attached scan.
> 7) The following two paragraphs, beginning with "an alternative explanation" and ending with "strange characteristics" were taken largely verbatim from www.unknownexplorers.com.
> 8) The next paragraph, from "There is of course" to "a cow dry" was taken from http://www.weird-encyclopedia.com/chupacabras.php, with the exception of the third and

fourth sentences, which were instead copied from www.weird-sciences.net.

According to our analysis, there are approximately fifteen sentences (out of four pages of copy) on this particular entry that may be Cheung's own words and that did not appear in works by previous authors. Most of these fifteen "original" sentences are so generic in content that it's difficult or impossible to trace a specific source. (I might also add that much of this information is not only plagiarized, but inaccurate as well. If Cheung is going to take other people's work and claim it as her own, at least she could use correct information.)

Once we knew what to look for, it became clear how Cheung "wrote" those entries of her book; she merely typed a subject name into the Google search engine and then cut and pasted paragraphs from the top three or four hits, changed a few words, and then submitted it as her own work.

Had Cheung done this but credited the writers and sources she copied from, this would merely demonstrate that she is a poor writer and lazy researcher. However, since in most cases the words are taken directly and unmistakably from other sources, it seems she has indeed engaged in plagiarism.

I note that Cheung provides a "Select Bibliography" at the end of her book with a few dozen sources. As I'm sure you're aware, this does not absolve Cheung (nor HarperCollins) from the charges of plagiarism. Any words taken from other sources and written by other authors and used without proper attribution constitute plagiarism.

Given how flagrant the plagiarism was, with Cheung apparently lifting well over three-quarters of other peoples' material for that one entry, it seemed unlikely that this was the only example in the book. So we continued the investigation, and selected entries at random to see if we could find evidence of plagiarism elsewhere. Indeed, it is apparently rampant in Cheung's book.

[I then provided five other examples of plagiarism in the book (see sidebars). Space does not permit a full elaboration of the plagiarism, but a full comparison between Cheung's

Plagiarism in 'Estrie' entry (p. 212) :

Cheung seems to have heavily plagiarized most of this entry in her book from Joshua Trachtenberg's book *Jewish Magic and Superstition: A Study in Folk Religion* (2008).

1A: "It is difficult to determine whether the *estrie* was regarded as a true demon, or as a witch; it was described, sometimes in the same source, as both. Included among the incorporeal spirits, it was none the less also a woman, a flesh-and-blood member of the community. In either guise her character was that of the vampire, whose particular prey was little children, though she did not disdain at times to include grown-ups in her diet. The sense of these passages appears to be that she is an evil spirit who adopts woman's form and spends her life among men, the more readily to satisfy her gory appetites. The equation of the *estrie* with the *broxa* leads one to believe that she was best known in her human form." (Trachtenberg 2008, 43)

1B: "It is difficult to determine whether the estrie was regarded as a true demon or as a witch, as it was described, sometimes in the same source, as both. Included among the incorporeal spirits, it was nonetheless always a woman, a flesh-and-blood member of the community. In either guise her character was that of the vampire whose particular prey was little children, though she did not disdain at times to include grown-ups in her diet. The sense of surviving descriptions about the estrie appears to be that she was an entity who adopted a woman's form and spent her life among men, the more readily to satisfy her gory appetites, and that she was best known in her human form." (Cheung 2010, 212)

2A: "If an *estrie* was wounded by a human being, or was seen by him (in her demonic state), she must die unless she could procure and consume some of his bread and salt. A man who was attacked by an *estrie* in the shape of a cat and beat her off, was approached by the witch the next day and asked for some of his bread and salt. When he was innocently about to grant her request an old man intervened and scolded him sharply for his generosity. 'If you enable her to remain alive, she will only harm other men.'" (Trachtenberg 2008, 43)

2B: "If an estrie was wounded by a human being, or was seen by one (in her demonic state), she would die unless she could procure and consume some of the person's bread and salt. According to one report, a man who was attacked by an estrie in the shape of a cat and beat her off, was approached by the witch in the form of a woman the next day and asked for some of his bread and salt. When he was innocently about to grant her request, an old man intervened and scolded him sharply for his generosity: 'If you enable her to remain alive, she will only harm other men.'" (Cheung 2010, 212)

Plagiarism in 'Vampire Myth: Rational Perspectives' entry (p. 410)

Cheung seems to have plagiarized more than a few lines in her "Rational perspectives" subsection for her "Myth, Vampire" entry from Karen Thompson and her piece "The Mythology of the Vampire" found here: http://kekrops.tripod.com/Mythology_Vampire.html (accessed March 3, 2011).

1A: "He certainly cannot be viewed only as a mythological phenomenon." (Karen Thompson)

1B: "it is a creature that cannot be viewed entirely from a mythological perspective . . ." (Cheung 2010, 410).

2A: "at the time when vampires were truly feared, people in coma or shock were often buried alive; those who managed to escape their premature graves were looked upon with awe because they had 'returned.'" (Karen Thompson)

2B: "At the time when vampires were truly feared, people in coma or shock were often buried alive; those who managed to escape their premature graves were therefore regarded as vampires." (Cheung 2010, 410)

3A: "Another facet was the coincidence of plagues and the onset of vampire attacks. The vampire attacks were always considered an epidemic because anyone killed by a vampire became one, and the numbers increased in a rapid mathematical progression as did the victims of a plague. The vampire, then, is at least partially scientifically explainable." (Karen Thompson)

3B: "Another facet of the story is the coincidence of plagues and the onset of vampire attacks. The vampire attacks were always considered an epidemic because anyone killed by a vampire became one and the numbers increased in a rapid mathematical progression, as did the victims of a plague. The vampire, then, is at least partially scientifically explainable." (Cheung 2010, 410)

For more examples, see Online Extras on our website at csicop.org/extras

work and the works she used is available on the CSI website at www.csicop.org/extras.]

There are likely more (many more) entries that may have been copied from other sources, but we stopped after finding evidence of plagiarism in a stunning eight out of ten randomly-selected entries we spot-checked. (For other suspicious entries you might want to start with Lastovo Island Vampires (p. 350)—compare with information at http://morbidhistory.tumblr.com/post/1182250736/lastovo-island-vampires.)

Whether the majority of this book was written by other authors (as I suspect), or just these, I cannot say. Ultimately, of course, the responsibility for the accuracy of what is printed lies with the author and the publisher. We have satisfied ourselves that there is enough evidence of plagiarism by this author to go forward with the investigation and bring it to your attention.

I note that Cheung is the author of at least three other HarperCollins titles; this could be the tip of a very big, very embarrassing iceberg if plagiarism plagues those other books as well. If HarperCollins chooses not to investigate Cheung's other titles (and perhaps those by other authors in the Element series), we just might do so ourselves. My advice, for what it's worth, is to do a thorough investigation and get ahead of the problem. I also note that Ms. Cheung thanks Jeannine Dillon, senior editor at HarperCollins, in the Acknowledgements.

As I'm sure you agree, plagiarism in HarperCollins titles is a serious issue that strikes at the reputation and credibility of the company, its authors, and imprints. Not only has Cheung apparently engaged in plagiarism, but HarperCollins may have violated laws by using copyrighted material in your books—likely from dozens of other authors. I have not yet contacted any of the various copyright holders to let them know about this issue.

The apparent plagiarism has other implications as well, such as for factual accuracy. If Cheung has simply cut and pasted other people's work, then she obviously cannot vouch for the factual accuracy of the material in her book. If a writer presents a book as his or her own, there is an expectation that the work was written by that person, and that the information has been examined and found credible by that author. If Cheung simply uses other people's word and work (with or without credit, and with little or no original research), how can HarperCollins ensure the factual accuracy of your books?

This case also raises questions about editorial competence. With such a diversity of writing styles from a variety of other sources supposedly having been written by Cheung, it's hard to see how experienced professional editors could have failed to detect the plagiarism. Of course, some author writing styles are more prominent than others, but it's curi-

ous that no one in the editorial department at HarperCollins apparently noted Cheung's broad range of styles. It is Theresa Cheung's name on the cover, Jeannine Dillon's name in the Acknowledgements as her primary editor, and HarperCollins's name throughout.

You noted in your previous email that HarperCollins "investigates any claims that are asserted against our books," and I will be happy to assist in that investigation in any way I can. I look forward to seeing the results of that HarperCollins internal investigation, and would appreciate being kept updated on the progress of that investigation.

I look forward to hearing from you, and hope we can schedule a time for an interview regarding this matter.

All best,

Ben Radford

I eventually got the following response back:

> HarperCollins adheres to the highest editorial standards and we take any allegations of plagiarism very seriously indeed. . . . We have investigated the issues you have raised below in relation to the "Element Encyclopedia of Vampires" by Theresa Cheung and published by Harper Collins Publishers Limited (the "Encyclopedia") and have discussed them with Theresa. In the creation of the "Element Encyclopedia of Vampires" the author conducted a vast amount of research using a wide range of different source materials. This was a huge undertaking conducted over a long period of time and, whilst the author assures us the highest standard of care was used, an understandable level of human error occurred and some source materials were not correctly credited. Neither HarperCollins nor Theresa would wish to deny credit to the authors of this source material and these will be referenced in all future print-runs of the Encyclopedia. We are also satisfied that the uses of the works in question are not a breach of copyright. We hope that this addresses your concerns.

The fact that over half of Cheung's book may not have been written by her was apparently all just a little mistake, "an understandable level of human error." Having written six books myself, I would be mortified if anyone found this level of human error in my writing. I replied,

> Thank you for your response, I appreciate you getting back to me promptly. I do have a very few follow-up questions, as your previous response was not entirely clear
>
> 1) In the majority of the entries we found problems with, Cheung simply did a Google search for a given topic, and then cut and pasted the material (often verbatim) into her own work. Is this normal and acceptable research and writing practice for HarperCollins nonfiction authors?
> 2) Since Cheung often used other authors' words and work (with or without credit, and with little or no original research), how can HarperCollins ensure the factual accuracy of this and other titles?
> 3) Did Cheung state whether or not her other books were researched and written with the same "highest standard of care"?
>
> Thanks, and I look forward to hearing from you.

I never did get an answer to these questions, and HarperCollins refused further comment. ■

Acknowledgements

I would like to thank Josh Hunt for his assistance in researching this case. Seeking the sources for plagiarized material can be a tedious and time-consuming effort. It may take an author mere seconds to cut and paste (or re-type) material from a given source, but re-locating that original source and identifying what specific material was used may take hours of time.

Note

1. As far as I can tell, Isaac Espinoza doesn't even exist and is likely a figment of someone's imagination in a snippet of fiction that got copied from one place to another without anyone bothering to do any basic research to find out if it's true. The fact that 200 websites report his existence and activities as fact should be profoundly embarrassing, and reveals the incredibly sloppy (or nonexistent) scholarship of these sites. This incident also provides insight into how dubious information can make the easy transition from unchecked, pure fiction of the Internet to the printed word published in a supposedly authoritative encyclopedia and endorsed by a reputable international publisher. Many people know enough to be skeptical about information on the web but assume that information in a fixed, printed form is likely to be more accurate and reliable because it has presumably been seen and fact-checked by editors—not to mention that an author would take pride in his or her work and be careful not to mislead or misinform readers.

Benjamin Radford is deputy editor of the Skeptical Inquirer, a research fellow with the Committee for Skeptical Inquiry, and he carefully follows proper reference citation in his books.

Join the Investigation!

If you would like to join this investigation, get a copy of *The Element Encyclopedia of Vampires: An A–Z of the Undead* (either used or from a library if you wish), and choose three or four random entries. Pick a dozen potentially unique or rare phrases or short sentences from the entry, and then enter them in a Google search. If you find a match, see if the words and sentences before and after it were also copied, and if they are, carefully note the source and URL. Participants can email me at bradford@centerforinquiry.net with their findings.

The 'Psychology Is Science, Not Witchcraft' Campaign

A report of the campaign led by the Polish Skeptics Club to eliminate invalid and discredited pseudoscientific tests from clinical and forensic psychology in Poland.

TOMASZ WITKOWSKI and MACIEJ ZATONSKI

The expansion of information technologies has resulted in a virtual arms race between pseudoscientists and skeptics trying to expose false claims. The Internet, Facebook, Twitter, and other social media and mobile technologies help us to reach thousands of people quickly. Nowadays, spreading myths is much easier than it was in the previous century—but so is exposing them. However, the fundamental problem (how to appeal to a wide audience with proper scientific evidence) still remains, and it cannot be easily overcome by technology. Skeptics struggle with how to engage the public in critical thinking. Critical thinking can be difficult, and many people believe in myths that cannot be easily disproved. How do we put doubt in minds indoctrinated for decades? How do we break through the wall of propaganda raised by commercialized pseudoscience?

One of the most efficient ways to overcome this problem is to present critical thoughts in catchy, fresh, creative, and simple forms that appeal to many and force individuals to reflect on the subject. An extraordinary, striking thought presented in an appropriate way can easily reach the media and the public—just as viral videos (or Internet memes) spread around the world.

A good example of such a skeptical "viral meme" was the "Overdose Event" during the 10:23 Campaign, carried out to raise awareness about sham (placebo) treatments unethically sold to the public as real medicines—specifically explaining to the public how doctors and scientists know that homeopathic "remedies" are just empty sugar pills. This international campaign, organized by skeptical organizations around the world and coordinated by Merseyside Skeptics Society in the United Kingdom, was launched February 6, 2011, at 10:23 AM in more than seventy cities across thirty countries on all continents. The launch date of the campaign (6.02 at 10:23) was chosen to honor Amedeo Avogadro—the Italian scientist most noted for his contributions to molecular theory. In tribute to him, the number of elementary entities in one mole of a substance (6.02×10^{23}) is known as Avogadro's constant. Homeopathic "remedies" (or "homeopathic confectionary" as we prefer to call them) claim to contain active ingredients in dilutions exceeding $1{:}10^{200}$. This means that homeopathic bottles of sugar pills (sold as medicines) do not contain even a single molecule of the substance they claim to contain.

The 10:23 Campaign turned out to be a major success of skeptics worldwide. Homeopathic sales dropped significantly in some countries, legislative changes were introduced in others, and one French manufacturer of popular homeopathic products is facing a $30 million class action lawsuit in Canada. The suit alleges that sales of Oscillococcinum, a homeopathic product marketed for flu-like symptoms, violate consumer protection laws by misinforming them about the contents of the supposed medication.

The three qualities that helped David defeat Goliath were accuracy, wit, and intelligence. Since skeptics around the world are usually David to pseudoscience's Goliath, it is necessary to organize events like the 10:23 Campaign.

The main logo of the campaign

Participants in the campaign

Polish skeptics have used similar tactics during a nationwide campaign against myths deeply rooted in the psychological sciences. To attract public and media attention to the problem of pseudoscientific claims and urban legends, we have chosen one myth strongly connected to clinical and forensic psychology in Poland—the Rorschach inkblot test.

Many clinicians believe that if we allow a person to respond to ambiguous stimuli, we can reveal their hidden emotions and/or internal conflicts. Many psychologists are strongly convinced that inkblots, unclear (blurry) photos, or even drawings made by patients are "secret passageways" to hidden personality traits. This somehow allows them to make an accurate diagnosis of numerous psychological disorders. Some of them even believe that they can penetrate the deepest and darkest parts of unconscious minds. The belief in the diagnostic power of—as we call them—"projective techniques" remains popular among psychologists despite the evidence showing otherwise. Unfortunately, not just clinical psychologists share these beliefs. Many forensic psychologists use these tests alone during their expert testimonials in court.

In fact, the Rorschach inkblot test is an extremely problematic instrument, and the majority of its indices have not been empirically supported. (See Wood, Nezworski, Lilienfeld, and Garb, "The Rorschach Inkblot Test, Fortune Tellers, and Cold Reading," Skeptical Inquirer, July/August 2003.) The Rorschach norms are problematic and tend to identify non-existent pathology in many normal people. The evidence for the validity of Rorschach tests in detecting thought disorder, and promising evidence for Rorschach indices for dependency, psychotherapy outcome, and a few other characteristics do not justify its overuse—especially in legal settings. Even the authors of the recent, more sanguine meta-analysis on the validity of individual Rorschach variables (Mihura et al. 2012) suggest caution in using this method and encourage clinicians to use multi-method assessments rather than basing conclusions on the Rorschach test alone. The problems described above are not atypical, nor are they limited to Poland. Underwager and Wakefield (1993) described many "horrible examples" related to the use of projective tests. Lilienfield (1999) and Lilienfeld et al. (2000) wrote detailed reviews about problems caused by applying projective techniques in clinical diagnosis.

The belief in the diagnostic power of—as we call them—"projective techniques" remains popular among psychologists despite the evidence showing otherwise.

The aim of this article is not to present problems caused by the use of poor methods of diagnosis, nor to present numerous research results. Instead,

we want to show the impact of a campaign planned, prepared, organized, and coordinated by the Polish Skeptic Club (KSP) in Poland in March 2012. The campaign was called "Psychology Is Science, Not Witchcraft," and its aim was to raise awareness to problems caused by overusing projective techniques (the Rorschach inkblot test being an excellent example) that are widely recognized (or even respected) among the public.

We—as skeptics and as psychologists—can either help people with our knowledge or seduce them with unrealistic empty promises. It is our choice, but also our responsibility.

The "Psychology Is Science, Not Witchcraft" campaign had three goals: To explain to the public that many projective tests have poor or no validity; to raise concerns among professional psychologists who still use such tests alone in clinical diagnosis or in legal proceedings; and to initiate public and scientific discussion about the use of projective techniques.

Preparations

Before the campaign, we obtained the support of some well-known academics and authorities in Polish psychology. As the second step, we brought together nongovernmental organizations and individuals interested in supporting our campaign. Next, we prepared content-related materials providing proper scientific evidence (such as research results). We created a list of public and private institutions that widely promote and use projective techniques in Poland and edited a list of frequently asked questions (FAQs). We also did an extensive literature search and prepared a list of all available evidence on projective tests. Having prepared the theoretical framework, we created graphics and artwork (pictures, drawings, banners, slideshows, T-shirts). We made ten banners, one for each inkblot from the original Rorschach test, describing potential dangers caused by projective tests. Most of them were focused on using projective techniques in court proceedings. Other artwork criticized the use of projective tests during job interviews (still performed in armed forces, national security agencies, and numerous private corporations when employing staff). Some banners pointed out the problem of spending public research money on inkblots. We also designed several T-shirts with different slogans.

One of the important elements of our campaign was the publication of Rorschach's original inkblot tables together with typical answers on the Polish version of Wikipedia and on numerous public and private Internet portals and blogs. Since they were originally published on the English version of Wikipedia (after the copyrights expired), they were translated into thirteen different languages. This fact remained unknown to many Polish psychologists. That's why publication of Rorschach's inkblot tests together with their interpretation in the Polish language triggered a wave of wrath and indignation among many clinicians. This led to a nationwide public discussion.

Just before the launch of our campaign we prepared a website, Twitter feed, and Facebook fan page dedicated to our campaign. At the very end we issued a press release to journalists and the media.

The Campaign

The following message was released to the media: "Over one hundred academics, scientists, students, and psychologists will protest against using invalid methods of psychological diagnosis." And it worked: Information about our campaign was published in major influential nationwide journals, newspapers, radio stations, and on the largest Polish Internet portals. Over 140 people from nine large nongovernmental organizations took part in the protest. Scientists, lecturers, and students wore the T-shirts for four days at universities, in their workplaces, and on the streets.

We issued an open letter to the Polish Psychological Association (PPA)—the largest association of psychologists in Poland—with a request to stop selling projective tests and using them in legal proceedings. The association directly supervises Laboratory of Psychological Tests Ltd. (LPT)—the main distributor of psychological tests in Poland. PPA has significant influence over diagnostic practices in Poland, because the Polish Ministry of Justice certifies all methods offered by LPT Ltd. for the purpose of legal proceedings. Unfortunately LPT sells and promotes

the use of many discredited projective tests, such as the Color Pyramid Test, the Szondi's Test, and others. Forensic psychologists in Poland are also allowed to use Minnesota Multi-phasic Personality Inventory (MMPI) offered by LPT Ltd., despite the fact that the copyright owner allowed its use for research purposes only (not for clinical diagnosis).

Supporters of our campaign were collecting signatures under the letter. The culmination of our campaign was on the fourth day, when we organized open lectures, debates, and discussions in Warsaw and Wroclaw—two major Polish cities and main academic centers.

Effects of the Campaign

Information about our campaign appeared in all mainstream media in Poland. It was broadcast on public radio stations, reported on nationwide TV news, in several newspapers, and on many websites. We collected 457 signatures (mostly from psychologists and academics) for our letter and sent it to the president of the Polish Psychological Association, Dr. Malgorzata Teoplitz-Winiewska.

There were also events organized independently as an effect of our campaign (such as local debates, invited lectures, and conferences). Discussions were held at major universities for over three months. The issues were discussed not only by psychologists but also by lawyers or people who were diagnosed by expert witnesses with invalid tests. As a result a large national conference took place in November 2012, where renowned Polish scientists met with advocates of projective tests to discuss "Conditions for the use of projection tests in psychological and forensic diagnosis." The PPA was one of the organizers of this conference.

There were also some side-effects of our campaign. Some university students participating in our campaign were harassed by university lecturers, and some of the researchers and lecturers involved in our actions suffered ostracism from their academic communities. Several accusations of self-promotion against campaign organizers appeared, as expected.

Despite the months since we sent the letter to the PPA, we have received no reply from this largest psychological organization. There may be lots of reasons why this happened, but so far 457 psychologists deeply interested in the quality of psychological diagnosis were ignored by the largest Polish association of psychologists.

To sum it all up—despite a few glitches we consider our campaign a success. You can certainly see a shared pattern and resemblance to the 10:23 Campaign that turned out to be a significant worldwide success for skeptical thinkers. We were strongly inspired by its authors and we thank them for this inspiration. There are a few differences between those two undertakings. The main message of our campaign was not as clear and simple as the famous "Homeopathy, there's nothing in it," and it was much more difficult to catch the attention of the media and the public with our message. To our satisfaction, we succeeded in attaining this goal in Poland. We realize that we did not stop the use of projective techniques by psychologists, and that we still have a lot of hard work to do. But we also strongly believe that skeptical organizations can repeat our success in their countries. Learning from our mistakes can help us prepare better events in the future. A worldwide network of engaged skeptics is fully capable of focusing public attention on pseudoscientific claims in all areas of our lives.

One of the greatest philosophers of science, Karl Popper, said: "Science must begin with myths and with the criticism of myths." Psychology seems to be an infinite source of unverified myths and claims. There are many widely held beliefs that "everyone knows are true." These popular beliefs are usually contradicted by psychological research, but they are still taught at many universities. We—as skeptics and as psychologists—can either help people with our knowledge or seduce them with unrealistic empty promises. It is our choice, but also our responsibility.

We invite everybody interested in carrying out a "Psychology Is Science, Not Witchcraft" campaign in your country to please contact Polish Skeptics Club. We will provide you with all artwork and graphic materials, and we will answer all the questions you might possibly have. You can count on our help, experience, expertise, and advice. ■

References

Mihura, Joni L., Gregory J. Meyer, Nicolae Dumitrascu, et al. 2012. The validity of individual Rorschach variables: Systematic reviews and meta-analyses of the comprehensive system. *Psychological Bulletin* (August 27).doi: 10.1037/a0029406.

Lilienfeld, Scott O. 1999. Projective measures of personality and psychopathology. How well do they work? Skeptical Inquirer 23 (September/October): 32–39.

Lilienfeld, Scott O., James M. Wood, and Howard N. Garb. 2000. The scientific status of projective techniques. *Psychological Science in the Public Interest* 1: 27–66.

Underwager, R., and H. Wakefield. 1993. Misuse of psychological tests in forensic settings: Some horrible examples. *American Journal of Forensic Psychology* 11: 55–75.

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Grumble Grumble

KEITH TAYLOR

"I disagree with what you say but I'll defend to the death your right to say it."

—*Voltaire*

If Voltaire were alive today he'd have a hard time selling that idea, and it was such an impressive idea too. A radio program of the 1940s, *Mr. District Attorney*, appropriated the line for a stirring lead-in. I knew what Voltaire said before I knew who he was.

Sadly the brightest light of the Enlightenment is out of date.

In today's cyberspace age he might feel the need to modify: *I may disagree with what you say, but I'll defend unto the death your right to forward it incessantly even if it's nonsense.*

Veracity is taking a beating nowadays. With the immense traffic jam on the electronic information superhighway most folks just give up and choose what they want to believe.

Then they send it around via Twitter, IM, Facebook, or the now increasingly obsolescent email. Discoveries are breathlessly passed on at the speed of light. And so are disagreements. Old friends send me things they know will upset me and then get upset if I disagree. Superstitions and impossible religious nonsense must be protected.

It's rough for a geezer like me. Many relationships built up over decades have become strained. Quite a few have been knocked for a loop.

We need some rules of discourse. I have written ten; I hope they help.

1. If you don't want your ideas challenged, don't send them to people who think.

2. Don't be surprised if your recipient ignores such admonitions as "If you don't agree with this, delete it." He or she may just keep it just as a reminder of how arrogant you are.

3. Keep in mind that "Don't send me that crap" means little if you're sending crap yourself.

4. Don't claim things without proof as fact unless it is something so obvious it cannot be disputed. "God wants you to vote Republican" does not fit that description.

5. If you don't care enough about what you send to check out its accuracy, I'll be glad to do so and send the findings to everybody on your mailing list.

6. Claims of the paranormal are encouraged as long as they are accompanied by proof of the paranormal.

7. Believing is not science. Do not treat something as if it is, even if it comes from a preacher . . . or a politician.

8. Sending an email telling a dissenter to "sit down and shut up" is not the best use of the First Amendment.

9. The wisest thing a person can say is "I don't know."

10. Or, it might be "I was wrong." I don't know. ■

Keith Taylor is a longtime member of the San Diego Association for Rational Inquiry. He served as president and/or program chair for many years. He can be reached at krtaylorxyz@aol.com.

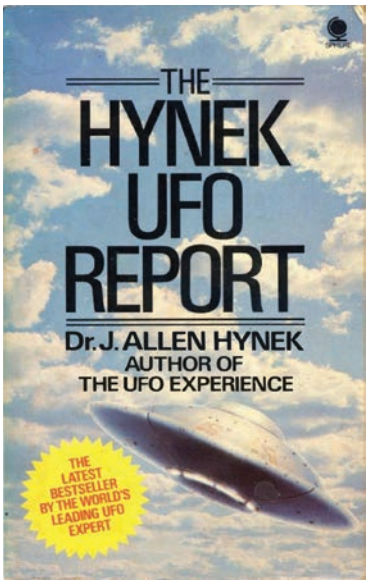
Vindication of My Notorious 'Insulting' Letter to UFOlogist J. Allen Hynek

GARY P. POSNER

John Franch's article "The Secret Life of J. Allen Hynek" (SI, January/February 2013) has rekindled memories of my correspondences of yesteryear with several prominent UFOlogists, among them Jerome Clark and Hynek. Clark, author of such books as *The UFO Encyclopedia*, for many years edited the *International UFO Reporter*, which until its discontinuation in 2012 was the bimonthly magazine of the J. Allen Hynek Center for UFO Studies (CUFOS).

Some of my exchanges with Clark were quite testy. One round of letters in 1992 revolved around a defamatory accusation he made in *IUR* about people affiliated with CSI that ultimately led to my hiring an attorney (see gpposner.com/loathsome.html). But a comment Clark had made to me years earlier came to mind as I read Franch's piece.

Allan Hendry (not to be confused with Allen Hynek) was the main investigator at CUFOS in the 1970s. In one of Clark's 1985 letters to me, he said, "Hendry once told me, by the way, that in the course of his employment at CUFOS the single rudest letter that organization received was written by you." A couple weeks later, his next letter again made reference to "the more frequent assertion (made, for example, in especially insulting fashion in the last paragraph of your January 26, 1978, letter to Allen Hynek) that proponents are irrational, money-grubbing publicity seekers."



I first wrote to Hynek (two pages) in 1976, while still a UFO believer. His two-page June 1 response (see gpposner.com/Hynek-1976.pdf) begins, "This is in reply to your kind letter of May 18th" and ends, "Thank you again for your letter. It is always a pleasure to correspond with someone who has his head screwed on straight. . . ." I next wrote to him (three pages) at the end of 1977, shortly after reading his latest book, *The Hynek UFO Report*. His two-page January 11, 1978, response (see gpposner.com/Hynek-1978.pdf) begins, "Thank you for your most excel-

> "Hendry once told me, by the way, that in the course of his employment at CUFOS the single rudest letter that organization received was written by you."
> —UFOlogist Jerome Clark

lent letter of December 27th. Because you have taken the time to write in considerable detail, I am putting your letter ahead of the stack to acknowledge it." And his stack nearly reached to the stars, as a result of his involvement as a consultant with the movie *Close Encounters of the Third Kind*. (Hynek had coined the "close encounter" classifications.)

My metamorphosis from UFO believer to skeptic was chronicled in the chapter (posted at gpposner.com) that I contributed to *Skeptical Odysseys* (Prometheus Books, 2001). As I detail there, my next missive to Hynek was four pages in which, having just discovered and devoured Philip Klass's *UFOs Explained*, I rebutted Hynek's letter point by point. Klass (who died in 2005), senior avionics editor of *Aviation Week* magazine and one of the founders of CSI, soon thereafter wrote to me of this letter:

> It was 7 p.m. before I left the office, exhausted from a hard day probing a very controversial international aviation issue, and by a cold and hacking cough that should have sent me to bed but for the press of Aviation Week business.
>
> But your letter [to Hynek] has moved me almost to tears and so I must respond tonight and express my thanks.
>
> Soon after I entered the "Strange Land of UFOria," I realized that I had undertaken a largely thankless task. That for most people, who think the whole issue is nonsense, I was on a fool's errand, while for those who are interested and who generally are "believers," my efforts would evoke only harsh criticism.
>
> But your letter of Jan. 23 [to Hynek] is ample reward for all my efforts—truly. What you have dared to say to the "Galileo of UFOlogy" [as Hynek had been dubbed in a recent issue of *Newsweek*] has long needed to be said. . . . You are the first, to my knowledge, to brazenly comment that the Emperor is NAKED!

I didn't think to mention in my chapter the two-page addendum (see gpposner.com/Posner-1978.pdf) I sent Hynek three days later after seeing him on a national television program the night before. This "rudest" letter's "insulting" closing paragraph reads:

> Thanks to TV Guide, I have been able to view many of your recent TV appearances, as you well know, and have found them to be quite distressing. Even if UFOs do represent a "quantum jump" phenomenon (and as I've said before, I hope they do), your illogical statements only serve to alienate (no pun intended) persons such as myself. If you continue to pursue your present course, your personal finances may remain sound, and you may even eventually get your own TV show, but I assure you that your credibility among the "logical" segment of the population (no matter how few of us there may be left) will erode to zero, if it has not already done so.

Had I known then about Hynek's "secret life," I might have found myself much less vexed by the man. Incorporating information revealed in Hynek's close friend and colleague Jacques Vallee's 1996 book, Franch tells of how Hynek "had been an enthusiastic though closeted student of the occult [and], for example, believed that there were planes of existence beyond the physical, and he even endorsed alleged instances of 'psychic surgery' and 'psychic photography.'"

Moving on from the "irrational" to the "money-grubbing publicity seeker" (as Clark interpreted my letter), Franch quotes a Vallee journal entry: "Media men hire Allen as they would hire a guitar player. He rushes wherever he sees a spotlight, and if the spotlight moves, he moves with it." And in a 1978 letter to a friend, Hynek boasted that "each one of my [UFO] lectures brings me more than my monthly pay from Northwestern [University]." Franch also quotes Vallee as having noted back in 1968 that "[Hynek] is no longer taken seriously among astronomers."

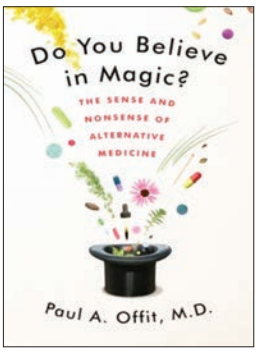
Thanks to my new awareness of Dr. Hynek's "secret life," any subconscious guilt that I may have been harboring for decades over my notorious "insulting" letter has now certainly been vanquished.

Thanks to my new awareness of Dr. Hynek's "secret life," any subconscious guilt that I may have been harboring for decades over my notorious "insulting" letter has now certainly been vanquished. ■

Gary Posner, MD, is founder of Tampa Bay Skeptics and a CSI scientific consultant. His website can be found at www.gpposner.com.

Do You Believe in Magic?

HARRIET HALL



Do You Believe in Magic? The Sense and Nonsense of Alternative Medicine. By Paul Offit, MD. *Harper Collins, New York, 2013. ISBN: 978-0-06-222296-1. 336 pp. Hardcover, $26.99.*

Dr. Paul Offit, a pediatrician and professor of vaccinology at the University of Pennsylvania, codeveloped a rotavirus vaccine that has saved hundreds of lives. His previous books *Autism's False Prophets* and *Deadly Choices* examined the misinformation spread by the anti-vaccine movement following Andrew Wakefield's infamous vaccine/autism study. Now he turns his attention to the field of alternative medicine with a new book, *Do You Believe in Magic? The Sense and Nonsense of Alternative Medicine.*

He explains why alternative therapies are popular: mainstream doctors are perceived as uncaring and dictatorial, offering unnatural remedies with intolerable side effects, while alternative healers provide natural remedies, comfort, and individual attention. But he warns that "natural" remedies mustn't be given a free pass. Unless we hold all therapies to the same high standard of scientific proof, we risk being hoodwinked by healers who believe in magic.

Being a scientist, Offit's approach was to review studies of various alternative treatments to see what worked. He found that most of them didn't, and when they did work, it was *how* they worked that was surprising.

Offit is a wonderful storyteller who makes his message come alive. Each chapter is a story that grabs the reader's interest and holds it. In the introduction, he tells us that when seven-year-old Joey Hofbauer was diagnosed with Hodgkin's lymphoma, he had a 95 percent probability of cure with radiation and chemotherapy. His parents rejected the oncologist's recommendations, and with the collusion of the courts they put him under the care of a psychiatrist who gave him Laetrile, coffee enemas, a "witch doctor's diet," and a mixture of other nonsensical treatments. Joey died riddled with cancer, and yet the psychiatrist went on to treat other patients the same way.

Unless we hold all therapies to the same high standard of scientific proof, we risk being hoodwinked by healers who believe in magic.

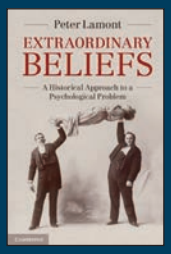
One chapter features Dr. Oz, describing some of the believers in magic featured on his show. Another chapter tells the story of Linus Pauling's unfortunate infatuation with vitamin C. Another tells how diet supplement industry lobbyists and colluding politicians neutered the FDA by passing the Diet Supplement Health and Education Act, allowing the marketing of products without any prior testing for safety or efficacy. He eviscerates Suzanne Somers for her anti-aging regimen and Jenny McCarthy for her crusade against vaccines. He reveals how a nonexistent disease, Chronic Lyme Disease, was invented and popularized and how the myth continues to harm patients. He builds on Steve Jobs's flirtation with alternative treatments for his pancreatic cancer to cover the larger story of bogus cancer cures, from shark cartilage to Krebiozen to Gerson therapy. A separate chapter is devoted to Stanislaw Burzynski, the "anti-neoplaston" cancer doctor who charges patients exorbitantly to be subjects in experiments that never seem to get published and who claims huge success rates that have never been confirmed when independent reviewers have looked at his cases. And then there's Rashid Buttar, who mistreated thousands of autistic children and cancer patients with useless (and potentially harmful) chelation therapy; and all the medical board did was order him to provide a consent form advising patients that his treatments were unproven.

Offit explains why alternative medicine is so seductive and how patients and doctors can be misled by the pla-

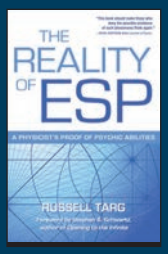
[NEW AND NOTABLE

Listing does not preclude future review.

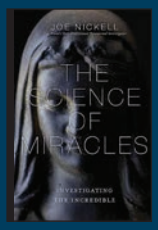
AMERICA BEWITCHED: The Story of Witchcraft after Salem. Owen Davies. Davies, a professor of social history at the University of Hertfordshire, follows up his previous book (*Grimoires: A History of Magic Books*) with this fascinating survey of belief in witchcraft in the three centuries since the Salem witch trials. According to Davies, more people have been killed as witches in America since the last witch trials officially ended than were killed before that time. Oxford University Press, 2013, 384 pp., $35.95.



EXTRAORDINARY BELIEFS: A Historical Approach to a Psychological Problem. Peter Lamont. The author (School of Philosophy, Psychology, and Language Sciences, University of Edinburgh) takes a historical approach to a continuing psychological problem: Why do people believe in extraordinary phenomena? Taking in turn mesmerism, spiritualism, psychical research, and parapsychology, he analyzes how each phenomenon has been made to seem convincing, and then disputed endlessly. Throughout, his emphasis is to go beyond simple explanations of why people believe—ignorance and wishful thinking, for example—to a more complex, realistic understanding. Cambridge University Press, 2013, 250 pp., $29.99.



THE REALITY OF ESP: A Physicist's Proof of Psychic Abilities. Russell Targ. In a book that Deepak Chopra says "provides convincing evidence" of psychic powers, laser physicist Targ spends nearly 200 pages rehashing old (and often discredited) claims of ESP (while routinely omitting skeptical rebuttals) before finally getting around to attempting to explain how psi might work. In a section titled "The Physics of Psi" (beginning with an admiring mention of mystic Madame Blavatsky), Targ eventually invokes quantum physics (a subject outside his field of expertise) before finally admitting that "No one presently knows how ESP works" (p. 204). Despite its subtitle, the book is more of a meandering memoir than any sort of scientific proof of ESP. Quest Books, 2013, 305 pp., $17.95.



THE SCIENCE OF MIRACLES: Investigating the Incredible. Joe Nickell. Veteran investigator Nickell uses on-site examinations, lab experiments, and other detective methods to uncover the facts about incredible claims in six major categories: miraculous images (such as "weeping" icons), magical relics (like the Shroud of Turin and the Holy Grail), miracle healings (Lourdes and others), visionary experiences (including near-death experiences), saintly powers (such as stigmata), and "the devil's work" (such as demonic possession). A comprehensive, science-based study of miracle claims. Prometheus Books, 2013, 375 pp., $18.00.

TALES OF PREHISTORIC LIFE: Pterosaur Trouble *and* Ankylosaur Attack. Daniel Loxton. Loxton—writer and editor of the kid-friendly *Junior Skeptic* magazine—puts his considerable illustration talents to work on a follow-up to his award-winning children's book *Evolution* in a new series of books for Kids Can Press titled *Tales of Prehistoric Life*. The two titles so far are *Pterosaur Trouble* and *Ankylosaur Attack*, each focusing on a vignette in the life of a different prehistoric beast or dinosaur. The vibrant, photorealistic illustrations are top-notch, paired with scientifically and historically accurate descriptions that are sure to feed interest in prehistoric life in kids and adults alike. Kids Can Press Books, 2013, 28 pp., $16.95.

—Kendrick Frazier and Benjamin Radford

cebo effect and can misinterpret the meaning of their observations. Instead of railing against alternative medicine as a whole, he thinks some of it has a certain value as "placebo medicine." He draws a line where alternative medicine crosses over into quackery:

- Recommending against conventional therapies that are helpful. (He mentions Andrew Weil, Joe Mercola, chiropractors, Deepak Chopra, and others as guilty of that sin.)
- Promoting potentially harmful therapies without adequate warning.
- Draining patients' bank accounts.
- Promoting magical thinking. It isn't harmless, and it encourages scientific illiteracy.

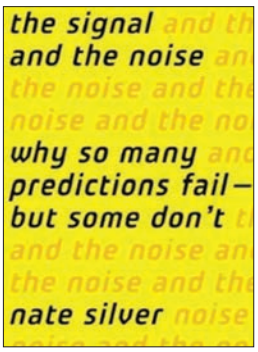
The subject is one I know a lot about, so I didn't expect any surprises. Nevertheless, he surprised me with back stories and intriguing details I had not known. I knew Suzanne Somers used bioidentical hormones, but I didn't know about all of the forty-seven other remedies she uses, or that she rubs glutathione into the skin over her liver to stimulate it. His explanation of the political machinations behind the FDA and diet supplement laws is the best I have read. He gives a wealth of interesting information while providing incisive insights into why patients and doctors do what they do.

Those who are put off by the hostility of other authors toward alternative medicine may be receptive to Offit's approach, since he thinks there is a place for alternative medicine (if only as placebo medicine). The book is well worth reading, whether you know a little or a lot about alternative medicine and whether you believe in magic or not. ■

Harriet Hall, MD, writes and educates about pseudoscientific and so-called alternative medicine. She is a Fellow and member of the Executive Council of the Committee for Skeptical Inquiry, a SKEPTICAL INQUIRER contributing editor, and regular contributor to the blog *Science-Based Medicine*.

Bringing Bayes into Predictions

PAUL G. BROWN



The Signal and the Noise: Why So Many Predictions Fail—but Some Don't. By Nate Silver.
Penguin Press HC, 2012. ISBN-13: 978-1594204111.
544 pp. Hardcover, $27.95.

Nate Silver's book *The Signal and the Noise* is about the mathematics of an uncertain universe. It's about the predictions that are possible playing dice or poker or betting on basketball games. But it's also about elections, the weather, earthquakes, the future of the planet's climate, diagnosing diseases, or mitigating floods. The book is a useful addition to a skeptic's bookshelf because the procedure it describes—known as *Bayesian reasoning*—is a basic building block of critical thinking. That said, there are better books out there on the subject, and the flaws in this one are instructive.

Silver's work on the 2008, 2010, and 2012 U.S. elections made fools of the entire cacophony of "horse race" TV pundits. To predict which candidate will win, Silver starts with an educated guess about the likely outcome based on the broad sociopolitical climate: unemployment, income growth, candidate quality, and so on. Then he combines this initial guess with polling data from multiple sources, calibrating each pollster according to how well (or how badly) they performed in the past. But rather than treating each new round of polling data as an exciting revelation of what is to come, he uses it instead to slightly adjust his guess. Then he waits for more polls.

This method is quintessential Bayes. The idea is to start with a general impression about what's probably the case. For best results, use contextually relevant information. But even a wild stab (50/50) or an educated guess (an expert's 80/20 opinion) will do for starters. We refer to the strength of this belief as the *prior*. It's useful to think about the *prior* as a kind of bet, with a potential loss or payoff. Just how much do you believe X is true? What odds would entice you to bet against your belief? Silver doesn't mention it, but Bayesian thinking is what underpins an axiom Carl Sagan popularized: "Extraordinary claims require extraordinary evidence." If the probability of your prior is very low, then the improbability of your observation must be extraordinarily high to compensate.

Next, you observe the phenomenon you're interested in, measuring it in a way that tells you whether you won or lost your bet. By applying some basic algebra, you combine the information in your *prior* with the evidence from your observation to arrive at a new level of belief called the *posterior*. But you don't stop there. In turn, this *posterior* becomes the *prior* for another round of betting and observation. And then another. . . .

One of the strengths of Silver's book is the way he demonstrates the limits of this kind of reasoning. It is unreasonable to ask geologists to predict imminent, destructive earthquakes, Silver explains, because destructive earthquakes are extremely rare, and the earth's constant movement makes it hard to distinguish something significant from the crust's everyday flexing. In other words, prediction depends on distinguishing signal from noise. Silver also explains the perils of "over-fitting," where inadequate data chases over-precise models.

So far, so good. But *The Signal and the Noise* isn't perfect. For starters, Silver's formal treatment of the mathematics is idiosyncratic. His presentation meets his minimal obligation to rigor, and because it lacks the daunting mess of letters, lines, and parentheses, it's probably easier to use in simple cases. Unfortunately, readers will have a lot to relearn in the next book about Bayes they pick up. Most textbooks introduce Bayes using the notation of conditional probability, and they traditionally convey the underlying intuition using Venn diagrams or a lattice showing all possible outcomes. Not Silver.

Being an ardent Bayesian, Silver also rejects *frequentism* and all of its works because of weaknesses inherent in its methods. Perhaps the best known of these involves "p values" and what they tell us about rejecting or accepting some hypothesis. Most students learn standard experimental technique. Divide your subjects into *control* and *test* groups (being careful to get the sizes right). Perform some procedure on the *test* group. Then observe the *control* and *test* groups' outcomes. If the outcome

of the two groups differs, and if this difference is very unlikely to have occurred by chance alone, reject the "null" hypothesis that your procedure has no effect.

The rub lies in the phrase "by chance alone." Unlikely things happen all the time. By convention, we reject the null hypothesis when $p < 0.05$, which means that a falsehood has a 1 in 20 chance of being accepted. Bad enough. But what's worse is the way this "false positive" effect can be exploited. Repeat the same experiment enough times and you're almost certain to eventually achieve any result you want, "by chance alone."

Silver is on solid ground here. But frequentist methods also provide tools for analyzing such data sets where Bayes is much harder to apply. In *The Signal and the Noise* we learn that Silver has made several careers with numbers. He's been a financial analyst, professional poker player, and he's written perhaps the world's best software for predicting how well baseball pitchers will perform. But he's never been a working scientist. And it shows. It's true that frequentist methods can be misapplied, but Bayes is no panacea.

Silver's chapter on climate change is a good example of how not to do it. After several pages of throat clearing about how strident the (nonscientific) debate is, Silver explains how recent moderation in the rate of increase in atmospheric temperature should reduce our subjective belief in the likelihood of anthropocentric climate change. He points out that the average global temperature in 2011 was pretty much the same as it was in 2001, where climate change theories suggest that we should bet on an increase.

The rub lies in the phrase "by chance alone." Unlikely things happen all the time.

In selecting temperature as his proxy for climate change, Silver ignores a host of other indicators that experts in the field also consider. If increases in atmospheric greenhouse gas levels are increasing the amount of solar energy trapped by Earth's atmosphere, then in addition to temperature changes, scientists predict a host of other effects: biological habitat changes, reduced polar ice, ocean acidification, reduced glaciation, increases in the number and severity of "extreme weather" events, and so on. Silver's selection of a single measure he was familiar with doesn't allow him to consider the totality of the evidence. (Even his choice of decade was instructive. Temperatures were sharply up over the decade ending in 2009.)

Bayesians can be subjective about their priors, but they must be ruthlessly objective about their evidence. A Bayesian who fails to consider all the evidence is no better than a gambler who doesn't pay up on losing bets. Frequentists sometimes joke that a Bayesian is someone who expects a duck, sees a beaver, and concludes a platypus. To use Bayes as well as Silver's basketball gambler it's first necessary to immerse yourself in the minutia of whatever you're trying to understand. Silver failed to do that on the topic of climate change, and in doing so, demonstrates precisely how *not* to apply Bayes. What makes Silver's mistake even more instructive is that the Intergovernmental Panel on Climate Change (IPCC) uses Bayesian techniques to integrate these multiple lines of evidence.

Silver's book reads like it is fumbling around the edges of a great problem. Useful and mostly true, but not the last word. ■

Paul G. Brown has spent twenty years putting bugs into software intended by its creators to play a useful role in large-scale data analysis. He's still at it.

Guide for Authors

The Skeptical Inquirer appreciates editorial submissions from knowledgeable scientists, scholars, writers, and investigators.

But before submitting a manuscript (feature article, review, commentary, column, or special report), please read our updated and expanded Guide for Authors. It is on our website at: **www.csicop.org/publications/guide.**

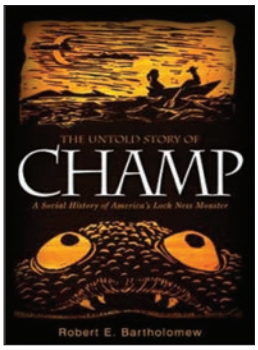
It provides guidelines on length, form, style, and references and gives submittal instructions.

—The Editors

The Biography of America's Lake Monster

BENJAMIN RADFORD

Robert Bartholomew and his brother Paul grew up near the shores of Lake Champlain, which not only sparked an early interest in the lake monster said to dwell within the lake but also steeped them in the social and cultural context of the mysterious beastie. In his new book, *The Untold Story of Champ: A Social History of America's Loch Ness Monster*, Robert, a sociologist, Fortean investigator, and former broadcast journalist, takes a fresh look at Champ, long dubbed "America's Loch Ness Monster."



The Untold Story of Champ: A Social History of America's Loch Ness Monster. **By Robert E. Bartholomew.**
State University of New York Press,
Albany, New York, 2012. ISBN: 978-1-4384-4484-0.
253 pp. Paperback, $24.95.

There have only been a handful of other books dealing in any depth or scholarship with Champ, among them Joe Zarzynski's *Champ: Beyond the Legend*, and of course *Lake Monster Mysteries: Investigating the World's Most Elusive Creatures*, coauthored by Joe Nickell and myself. *The Untold Story of Champ* builds on these books and others, correcting some mistakes and putting the information in its social and historical context—which, as I have often argued, is vitally important for truly understanding mysterious phenomena. Along the way, Bartholomew fills in fascinating gaps and details in the story of Champ.

But Bartholomew does something that no other author has, taking us behind the scenes for a glimpse at the colorful personalities that have gathered over the years (and especially in the early 1980s when Champ fever was at its peak). The story of those who looked for Champ is just as interesting as the story of Champ itself. Famed showman and huckster P.T. Barnum makes an important appearance (offering $50,000 for the monster's carcass in 1873), as do many prominent cryptozoologists, including Philip Reines, Loren Coleman, J. Richard Greenwell, Roy Mackal, and others who convened a 1981 conference titled, "Does Champ Exist? A Scientific Seminar." The intrigue between and among these researchers is interesting enough to fill several chapters.

There are several good books about the people involved in the search for Bigfoot, including *Anatomy of a Beast: Obsession and Myth on the Trail of Bigfoot* by Michael McLeod, *Bigfoot: The Life and Times of a Legend* by Joshua Blu Buhs, and *Searching for Sasquatch: Crackpots, Eggheads, and Cryptozoology* by Brian Regal. But there has been comparatively little insight into the motivations and personalities of those searching for lake monsters, and this book nicely fills that gap.

The book exhaustively reviews Champ sightings, both early and modern. Bartholomew uncovers common myths along the way, such as that the beast was first sighted by the explorer after whom the lake was named, Samuel de Champlain. The best evidence for Champ, the famous 1977 photograph by Sandra Mansi, is presented in some detail, and the book offers new, tantalizing revelations about the circumstances of Mansi's sighting and the publication of her photograph. (See also Bartholomew's recent SI article on the Mansi photo, "New Information Surfaces on 'World's Best Lake Monster Photo,' Raising Questions," May/June 2013.)

Like virtually all "unexplained" phenomena, the history of Champ is in part a history of hoaxes, and the book examines several of them in detail, including a similar story from nearby Lake George, which had its own lake monster—and, of course, its own lake monster hoax. Bartholomew's book is, at its heart, a skeptical book, but its goal is not to prove or disprove the creature's existence. It is instead exactly what the subtitle announces: an objective social history of the creature covering nearly a century and half of sightings, discussion, and debate, informed by folklore, cryptozoology, Fortean studies, local Vermont history, skepticism, and the inevitable crackpot.

Of interest to skeptics and believers alike (and accessible to both the casual mystery enthusiast and the academic researcher), *The Untold Story of Champ* is one of the best books on the subject, and it is especially recommended for those with an interest in cryptozoology. ■

Benjamin Radford is deputy editor of the Skeptical Inquirer and a member of the American Folklore Society.

Scotland Mysteries | Herbs Are Drugs | The Pseudoscience Wars | Psi Replication Failure | Morality Innate?
Skeptical Inquirer
THE MAGAZINE FOR SCIENCE AND REASON
ON INVISIBLE BEINGS
Clever Hans's Successors
Testing Indian Astrology
Believers' Cognitive Dissonance
CSICon Nashville Highlights
Published by the Committee for Skeptical Inquiry

Invisible Beings

In the discussion of invisible beings in the March/April 2013 issue ("Treatise on Invisible Beings" by Joe Nickell and James McGaha), one important consequence of invisibility was ignored. A person such as H.G. Wells's Invisible Man would be blind!

We may first consider that if the lens in each eye of the invisible person had the same refractive index as air, it would not focus the image to the retina. At the very least, the person would see a blurred image. But we may go even further. We are able to see because the photons impact the photoreceptors in the retina. If all components of the eye are totally transparent, there will be no impact and no signals will be sent to the brain.

Ed Wysocki
Orlando, Florida

Indian Astrology

Jayant V. Narlikar's article "An Indian Test of Indian Astrology" in your March/April 2013 issue exposed the unscientific nature of the populistic ancient belief. There are certain vital points to be noted which were missed in the article.

Indian astrology is based on nine planets—of which four are not planets. Rahu and Ketu are the mythological planets based on Hindu tradition. They are nonexistent. The Sun is a star and not a planet and yet it is included as one of nine planets. The Moon is not a planet but is categorized as a planet. When the major premises are wrong, naturally the conclusions cannot be right.

Indian astrology never studied nor compared its system with astronomy. The astrologers were ignorant of the distance of stars and planets from Earth and equally ignorant of the effect of light on humans. Similarly they are ignorant of constellations.

Indian astrology was challenged by scientists like Pushpa P. Bhargava in the Indian Supreme Court. The Court expressed the view that since astrologers wish to study from a scientific point of view, they may be given opportunity to do so (March 2004). It was never implemented, of course.

People like Abraham Kovoor, Dr. Narasimhaiah, vice chancellor of Bangalore University, and humanist philosopher M.N. Roy (1887–1955) challenged the claims of Indian astrologers, which go unanswered, of course.

Innaiah Narisetti
Former Chairman,
CFI–India
Brookeville, Maryland

Respect and Humility

James Walker ("Understanding Believers' Cognitive Dissonance," SI, March/April 2013) makes a statement that is both highly laudable and extremely critical to the interaction between many (if not most) believers on the one hand, and the scientific and skeptic communities on the other: "If we merely mock or make light of a believer's beliefs, without also expressing our respect for their right to hold those beliefs . . . we will most likely drive them deeper into their mindset. While we say that we want others to respect our beliefs, what we really mean is that we want them to respect us as individuals."

Herein lies the problem with "fundamentalist" atheists such as Richard Dawkins, Sam Harris, Bill Maher, and the late Christopher Hitchens: their attitudes and approaches are condescending, denigrating, and dismissive. Even setting aside the mean-spiritedness of such an attitude, it is also self-defeating: if one of the goals of the skeptic community is to get believers to learn and accept science in various areas, then condescension and denigration will not only serve to "drive them deeper into their mindset" (as a general matter), but will also cause them to reject both science and scientists as "the enemy." There are many believers who accept science in various areas (including a thirteen-billion-year-old universe and evolution) and might well be willing to accept more (over time)—*if* they are approached with respect and, yes, humility. But the so-called "New Atheists" refuse, seemingly on principle, to show any humility or respect whatsoever.

Although Mr. Walker almost undermines his otherwise even-handed tone with occasional broad-brush and paternalistic asides, his overall approach is far more likely to find converts (or at least open minds) from the "flat-Earth" mindset than the scorched-earth approach of Mr. Dawkins et al.

(Rev.) Ian Alterman
New York, New York

The writer is pastor of Spirit Fellowship Ministries.

Reading the March/April issue of the Skeptical Inquirer, I was struck by the breadth of subjects to which skeptics apply their critical thinking. Some are curious and interesting, such as "Invisible Beings," "Ancient Aliens," the "Perpetual [Motion] Discussion," and the "Denver Fly," but are unlikely to affect most of us directly. We are more likely to be directly affected by herbal medicine, as discussed by Steven Novella in "Herbs *Are* Drugs" and in the long run by "Quackademic Medicine" reported by Kendrick Frazier to be infiltrating our medical schools. Even more common are the telemarketing frauds discussed by Anthony Pratkanis

(and reported by Frazier). I hope that these frauds and the measures to counteract them may be discussed in detail in a future issue of the Skeptical Inquirer.

Extending further into the marketplace from outright frauds are the even more common deceptions that we all are aware of and that may be used to sharpen our critical-thinking axes. Gambling in the form of lotteries, slot machines, and casinos plays upon our wishful thinking, although we may know that the chances of losing are greater than winning. Gambling has become a major industry, sanctioned by states and providing from the "sucker tax" a major source of state revenue.

David W. Briggs
Marion, Massachusetts

Rooting Out a Number

I want to point out what is surely the least significant error in the history of the Skeptical Inquirer. In the article on the Elberfeld horses in the March/April 2013 issue, the example problem given should contain the number 4356 rather than 4536, since the former is a perfect square while the latter is not, and so no horse, however clever, could tap out its square root.

Thomas Pickett
Evansville, Indiana

Stefano Vezzani replies:

Thank you. I will correct the mistake in the book I'm writing on the topic.

Piltdown and Science Sociology

In his discussion of how science works ("The Proper Role of Sociology of Science," SI, March/April 2013), Massimo Pigliucci offers Piltdown Man as an example of scientists holding untrue beliefs for nonrational reasons. Rather, I see this episode in the relatively new field of anthropology as an example of science working as it should.

There was no reason to suspect this discovery was a forgery designed to lead scientists to a different trail of hominid evolution. Anthropologists did their best to fit it into the framework of genuine hominid fossils they had at that time (1912). For reasons obvious to us now, they were never very successful at this and usually showed Piltdown as an offshoot of the family tree they were trying to construct. Their difficulties eventually led them to look at the fossil more critically and only then did they find it to be a clever hoax.

Don Keith
Waterloo, Ontario, Canada

I enjoyed Massimo Pigliucci's column "The Proper Role of Sociology of Science," and agreed heartily with nearly every word of it. However, I believe the examples he used to illustrate scientists holding beliefs for nonrational reasons (Piltdown Man and eugenics) did not illustrate his point very well. First, scientists accepted the Piltdown fossils for perfectly rational reasons. They were specifically treated to look old, they were planted with other fossils to give proper context, and the fossils were designed to corroborate the then current hypothesis of what an early human fossil would look like.

Second, eugenics cannot be said to be a belief that is held for nonrational reasons. Scientifically, it would be quite surprising if it turned out that we could *not* modify the characteristics of human populations using selective breeding techniques, therefore it is perfectly rational to believe that eugenics could be applied for this purpose. Whether we should actually do so or not is a different and entirely nonscientific question.

In summary, I certainly accept Pigliucci's point that scientists often believe things for nonrational reasons; I just don't believe the examples he used were apt. Perhaps two better examples might be Freudian psychology and N-rays.

Randy Raymond
Augusta, Georgia

In his column on the role of sociology of science, Massimo Pigliucci criticizes the "strong program" of SSK (sociology of scientific knowledge) for wanting a style of explanation that is "symmetrical" so that the same causes would explain true and false beliefs. James Alcock in Kendrick Frazier's account of the CSICon conference (same issue), however, noted in a session on Belief and Memory, that "The 'feeling of knowing' is an emotion and is not tied to knowledge and may have nothing to do with reality." To this reader it seems that the SSK program wants to understand the social contributions to our "feeling of knowing" and so the symmetry the program looks for does not seem necessarily wrong. Everyone, whether committed to the methods of science or not, believes numerous assertions to be true, and some of everyone's beliefs are almost certainly false. Finding the social (or the neurological, for that matter) contributions to that "feeling of knowing" does not seem an unreasonable undertaking.

Don Martin
Toronto, Ontario, Canada

Massimo Pigliucci replies:

Don Keith and Randy Raymond are correct that the Piltdown episode is a good example of the (long-term) self-correcting mechanism of science. But sociological factors were definitely not extraneous to the quick initial acceptance of the hoax. British scientists were all too happy to show that the dawn of humanity happened on British soil, for instance. So it is not accurate to say that scientists accepted the findings for entirely rational reasons.

The eugenics case is more complex, and it is of course true that it is possible, in principle, to genetically "improve" the human species. But I encourage interested readers to get acquainted with the history of eugenics, which did include quite a number of pseudoscientific notions, for instance related to race genetics.

Don Martin's comments are interesting, but the fact remains that—quite apart from "feelings of knowing"—it is not possible to understand the scientific enterprise if one does not include epistemological considerations along with the sociological and psychological approaches. Otherwise we would have no way to tell science apart from any pseudo-claim to knowledge.

Velikovsky and the Bible

It has long bemused me that the critiques of Immanuel Velikovsky's work (David Morrison's review of *The Pseudoscience Wars*, SI, March/April 2013) have concentrated almost exclusively on his bizarre celestial mechanics, rather than on his equally bizarre use of the sources that allowed him to posit the Venus incident.

It is well known that Velikovsky's primary aim was to validate biblical accounts of such events as the parting of the Red Sea and the collapse of the walls of Jericho. Doing this would, he thought, encourage his readers to accept the remainder of the Bible as equally "true."

Beyond this, his *modus operandi* was simply to apply the same treatment to completely random ransackings of ancient and modern myths that could be construed as speaking of celestial and terrestrial events and that

are as different from one another as they are alike. To do this, he further presumed that all these myths—however and wherever collected—refer to the *same* event, which he then dated to conform to his biblical chronology. Thus, whether they realize it or not, all Velikovskians are at the same time Christian fundamentalists as well.

Any sensible (i.e., evidence-driven) interpretations of myth recognize that their evidence is—at best—multiple reified accounts that change dramatically, but undetectably, over time and that they can have no probative value when treated as historical.

Velikovsky's wildly uncritical use of such ahistorical sources is sufficient of itself to undermine his further allegations that have attracted so much attention. At its source, it's really nothing more than another pedestrian demonstration of the Garbage In, Garbage Out theorem.

David Henige
Madison, Wisconsin

David Morrison replies:

I agree with much of Henige's letter. But Gordin in his book, and I in my review, emphasized pseudoscience, with Velikovsky as an example. So many people focus solely on Velikovsky and ignore the larger picture.

I do disagree with Henige's second paragraph. I have never seen evidence that this was Velikovsky's motive or intent. I am contacting Michael Gordin to ask if he agrees. Velikovsky was a secular Zionist in the European tradition. And he certainly was not a Christian, so it seems weird to think that he accepted the remainder of the Bible as "true."

Michael D. Gordin, author of The Pseudoscience Wars, *replies:*

I agree completely with David. Not only was Velikovsky not a Christian fundamentalist, he was rather hostile to Christian fundamentalists, and one can easily observe this in his engagement with creationists, which I detail in Chapter 5 of my book. The larger point, however, is about whether Velikovsky thought that his purpose was to get people to accept the Bible as true. Although it is clear that for him the biblical evidence was extremely important, both his own narratives and those available from his reading notes, marginalia, etc., show that part of the reason he found specific episodes in the Bible to be credible is that they correlated with other ancient mythological evidence. The letter-writer might just as well have said that Velikovsky's goal was to substantiate the Vedas, which I doubt is the direction he would go.

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Perpetual Motion

Re: "Perpetual Discussion!" by Mark Levy (Forum, SI, March/April 2013).

While the gist of his article properly denounced perpetual motion as pseudoscience, Mark Levy committed what Terence Hines, two articles later, calls "one howling error." The Dean patent had nothing whatever to say about perpetual motion or running without an energy input. It was entirely a method of converting mechanical motion from one form to another as the patent's title says, in the same category as a crankshaft converting reciprocating motion to rotary motion. The drawing itself shows a power input shaft on the right (20-21-22).

I remember the Dean-machine story well. John Campbell, the legendary editor of *Analog* (maybe it was still called *Astounding* then) featured it prominently, and proposed it as a spaceship drive. I think it even got a cover illustration that month. Dean's demonstration model used an electric drill as a power source for rotary motion, as I recall.

A high-school friend and I mocked up a crude model of the device and found that it did produce some detectable output thrust, as Dean described, but the spinning weights that produced the thrust (14 and 16) had to be of the same order of magnitude (mass) as the load the device was to lift, which would have made the whole thing impractically heavy and bulky for the heavy lifting that Dean and Campbell proposed.

Dead-end device though it may have been, it does not belong in the swamp of perpetual-motion gadgets, and Dean deserves an apology.

Ken Moses
Stillwater, Minnesota

Whatever else N.L. Dean may have intended in his "Converting Rotary Motion into Unidirectional Motion" machine, it had nothing to do with "Perpetual Motion." Mr. Levy should do a bit more research next time.

Paul Weber
Albuquerque, New Mexico

Mark Levy's excellent article was slightly marred by a small error in the explanation of the perpetual motor. It is quite possible that the error lay in the patent rather than Mark's explanation.

Points: 1) the bellows *cannot* remove "all the air" from the bulb. Not even a good vacuum

pump could do that. 2) The buoyancy of the bulb is due to the *difference* in its "density" and the density of water. A vacuum-filled bulb would be less dense and have greater buoyancy. Forcing compressed air into the bulb would make it sink. The bellows compress the air.

Google for Cartesian diver experiment.

Robert R. "bz" Zinn
Programmer (retired)
Department of Chemistry, LSU
Baton Rouge, Louisiana

Herbs as Food

Steven Novella ("Herbs *Are* Drugs," SI, March/April 2013) says that "Herbs have . . . the same potential for side effects and toxicity as any drug." But this is not true in the case where the herb in question is in widespread use as an herb. If I eat a certain quantity of garlic because I think it provides some health benefit, I'm no more likely to experience an adverse effect than if I eat that same quantity of garlic because I like the taste. Since we don't advise people to avoid garlic as a flavoring for fear of adverse effects, we shouldn't advise them to avoid it as a remedy for that reason. (We might tell them it's useless as a remedy, but that's a different issue.) I would find the rest of what Dr. Novella says more credible if he would distinguish between common foodstuffs and unusual and potentially dangerous plants.

Ken Olum
Sharon, Massachusetts

When Certificates Get Dates Wrong

Ben Radford's Skeptical Inquirer column on the Adam Lanza birth certificate, and the likelihood its wrong date is due to a simple typo ("Sandy Hook School Shooting: The Adam Lanza Death Certificate Conspiracy," SI, May/June 2013) rang very true with me. Here's why.

My son was born April 7, 1989, in King's Daughters Hospital, Temple, Texas. When we received his birth certificate, however, it listed the date of birth as April 4. Well, that's easily explained; someone wrote down the correct 4-7-89 at some point and when it was re-entered they just entered a 4 followed by another 4 instead of the correct 7.

Like your example with the daughter of a friend, three days was no big deal, but who knew what problems might come along in the next week or in twenty or forty years. So I decided I'd get it changed to the correct date.

- We called the hospital, which informed us we'd have to get it changed by the state because it was now part of their records. So I drove to Austin and went to the appropriate state agency.
- They told me it was a county or city records issue and I would need to go to the Bell County Clerk in Belton or the City of Temple. So, I drove to Temple and went to City Hall.
- Where I was told the city did indeed have the birth certificate for my son who was born on April 4. I told them that was what I was there to correct. They said I needed to go to the hospital. Which I did.
- At the hospital I was told they couldn't change an official government document, and they suggested I contact the city. At this point I was pretty frustrated (as you can imagine) but I did decide to go back to Temple City Hall one more time.
- Where I lucked out, met one of these competent longtime employees without whom nothing would ever get done in a bureaucracy. She listened to my story, delivered herself of a few choice opinions on medical records staffs, called the hospital, identified herself, made a few pointed comments, hung up, and turned to me with a smile, "Their internal records have the birth in three separate places, all showing April 7," she said.

The city changed the date. So did the state. I wrote a column about the lady, who was about to retire, and at the next city council meeting, the City of Temple honored her for her dedication to public service.

Occam's Razor indeed.

Mike Brown
Editor
Rockdale Reporter
Rockdale, Texas

These Wonderful Articles

I've finally gotten a moment to spend with my first SI, and what a waste my waiting time has been. Why did I wait so long to sit down and read these wonderful articles? Why did I not stop everything right away and give the magazine a good reading? I don't know, but it will not happen again. The articles were all so well written, and all very interesting. I enjoyed how well researched the topics were. I loved the reference section, and all the APA style in-text citations. Nothing says upfront, honest, and carefully examined like in-text citations and a reference page.

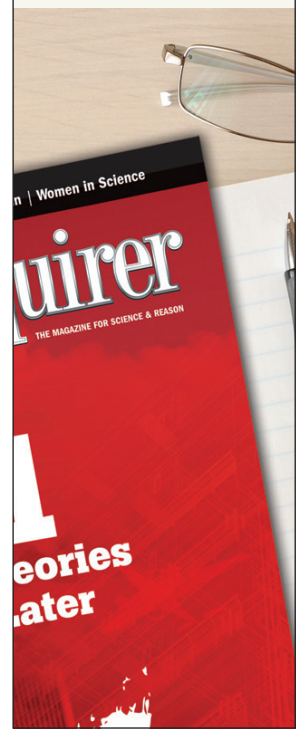
I enjoyed "Indignation Is Not Righteous" a great deal. The writing was great—the authors clearly defined the terms that leave no reader confused. Of course short articles like the "Bees" held great appeal to me as well. Brevity is not only the soul of wit but the mark of a clear argument.

Thank you so much for your work, and all the work of the authors—they spend many hours reading, researching, and documenting so that we can have better articles and a better understanding of the issues. I'm so glad I watched that episode of *Is it Real* . . . which led me to this publication.

Marshall Wayne Lee
marshall_w_lee@ymail.com

[FEEDBACK

The letters column is a forum on matters raised in previous issues. **Letters should be no longer than 225 words**. Due to the volume of letters we receive, not all can be published. Send letters as email text (not attachments) to letters@csicop.org. In the subject line, provide your surname and informative identification, e.g.: "Smith Letter on Jones evolution article." Include your name and address at the end of the letter. You may also mail your letter to the editor to 944 Deer Dr. NE, Albuquerque, NM 87122.



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SKEPTICAL ANNIVERSARIES

by Tim Farley

July 8, 1913: A St. Louis woman claims to begin communicating with a Pilgrim woman named "Patience Worth" via Ouija board.

July 20, 1993: Deputy White House Counsel Vince Foster's suicide later spawns many political conspiracy theories.

July 22, 1933: George Spicer and his wife claim to see "a most extraordinary form of animal" near Loch Ness.

August 6, 1983: Michael Shermer has a "skeptic epiphany" during a bicycle race. He recounts the story in the first chapter of *Why People Believe Weird Things*.

August 15, 1978: A Federal Grand Jury indicts MarySue Hubbard and other top Scientologists as a result of "Operation Snow White."

August 15, 2008: Two Georgia men hold a news conference with Bigfoot hunter Tom Biscardi regarding a frozen sasquatch corpse. It later turns out to be a Halloween costume stuffed with animal remains.

August 27, 2008: The television program *Mythbusters* airs an episode debunking Apollo moon landing hoaxes, later nominated for an Emmy award.

Tim Farley is a research fellow with the James Randi Educational Foundation and created the website whatstheharm.net.

SIMON SINGH
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Broadcaster, science promoter and science writer extraordinaire. The official hero™ of the sceptical community.
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Casting the shadow of a pineapple with his head
88%
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98%
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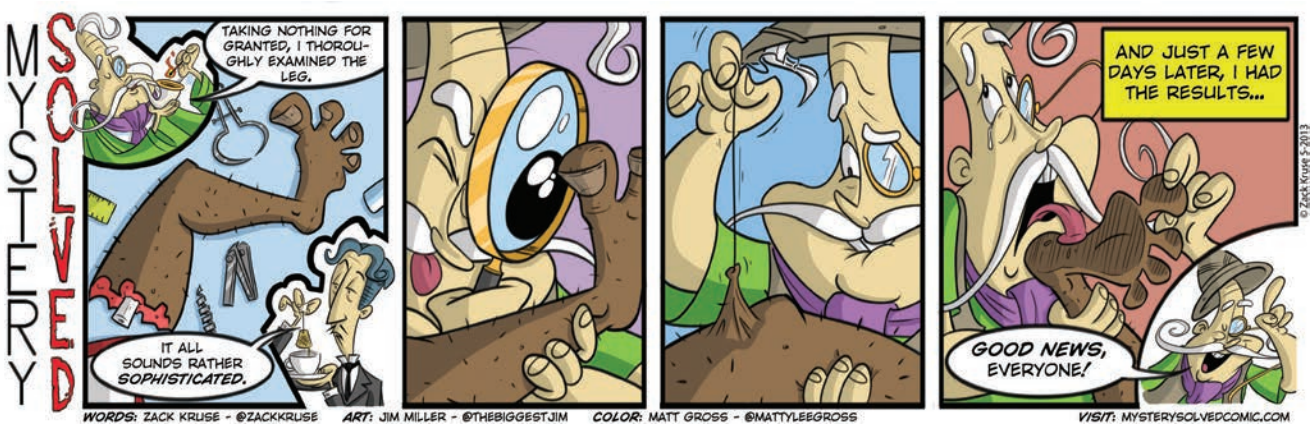
MYSTERY SOLVED
TAKING NOTHING FOR GRANTED, I THOROUGHLY EXAMINED THE LEG.
IT ALL SOUNDS RATHER SOPHISTICATED.
AND JUST A FEW DAYS LATER, I HAD THE RESULTS...
GOOD NEWS, EVERYONE!
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